THE STRUCTURE OF MALTHUS' POPULATION THEORY

By Antony Flew

I

In the Preface to the second and definitive edition of his *Essay on the Principle of Population* Malthus wrote: "The main principle advanced is so incontrovertible, that, if I had confined myself merely to general views, I could have intrenched myself in an impregnable fortress; and the work in this form would probably have had a much more masterly air" (Sixth Edition, Vol. I, p. vii). Instead he preferred to provide a mass of detailed applications to particular cases and a series of specific policy recommendations. I propose in this paper to explore the possibility which Malthus decided to forswear. The method will be: *First*, to try to uncover the logical skeleton of theory which provided the organizing and supporting framework for both his empirical enquiries and his policy recommendations. *Second*, to examine this structure, considering the connexions, and lack of connexions, between its parts, and whether it is, or could with comparatively minor improvements be made, invulnerable. *Third*, to take this simple and yet very important example of a theory in social science, and to consider its nature and function as a whole.

We shall have to give much straightforward exposition of Malthus. But since the grossest misconceptions of his views are widespread, this is no bad thing even in itself. It would be as pedantic to complain that Malthus himself was always scandalized by the practices called in Mr. Aldous Huxley's *Brave New World* "Malthusian drill" as heavily to point out that Plato was no unqualified advocate of 'Platonic love'. No doubt we must simply reconcile ourselves to other misrepresentations as extreme made in the heat of political and religious controversy. But it is time to protest when the published version of a degree thesis on the

A

Malthusian controversy repeatedly reiterates such canards as: that he was opposed to all population increases; and that he said no substantial increase could occur in England without disaster.[1] These particular accusations were specifically repudiated by Malthus in the *1806 Appendix* (Vol. II, pp. 444-5 and p. 450).

The main sources for Malthus' views on population are four. First, the first edition of the essay, *An Essay on the Principle of Population as it Affects the Future Improvement of Society, with remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers*. This appeared in 1798 and was reissued in facsimile by Macmillan (London) in 1926. As its full title suggests, it was an occasional polemic directed particularly at various currently fashionable utopian writers. We shall refer to this, in the facsimile edition, as the *First Essay*. Second, the second edition of the essay, significantly retitled *An Essay on the Principle of Population; or, a View of its Past and Present Effects on Human Happiness; with an Inquiry into our Prospects respecting the Future Removal or Mitigation of the Evils which it occasions*. This appeared in 1803, and, as the author himself said in the Preface, "In its present shape it may be considered as a new work . . ." (Sixth Edition, Vol. I, pp. v-vi). We shall refer hereafter to this, always in the pagination of the more accessible and in the main text substantially unaltered sixth edition of 1826, as the *Second Essay*. This is no occasional polemic but a laborious treatise offered as the author's definitive contribution to the subject. Third, appendices to the third and fifth editions of 1806 and 1817, also published separately in the same years, in which Malthus "wished to correct some of the misrepresentations which have gone abroad respecting two or three of the most important points of the Essay" (*Ibid.*, Vol. II, p. 443). To these we shall hereafter refer as the *1806* and *1817 Appendices*, using again the pagination of the sixth edition. Fourth, *A Summary View of the Principle of Population*. This consists of the greater part of Malthus' article 'Population' in the 1824 Supplement of the *Encyclopædia Britannica*, and, appearing in 1830, four years before his death in 1834, is his last published statement of his theory. It has recently been conveniently reprinted in *Introduction to Malthus*, edited by D. V. Glass (Watts, 1953), and we shall refer to this edition. These are not quite all the original sources but they are all the main ones, and are for present purposes sufficient.

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[1] K. Smith, *The Malthusian Controversy* (Routledge, 1951): p. 24 and p. 27; and p. 254.

II

(a) The foundation of the whole structure is in every successive treatment substantially the same, but it is presented most powerfully in the *Summary*. "In taking a view of animated nature, we cannot fail to be struck with a prodigious power of increase in plants and animals" (p. 119). "Elevated as man is above all other animals by his intellectual faculties, it is not to be supposed that the physical laws to which he is subjected should be essentially different from those which are observed to prevail in other parts of animated nature" (*Ibid.*, pp. 121-122). ". . . all animals, according to the known laws by which they are produced, must have a capacity of increasing in a geometrical progression" (*Ibid.*, p. 123).

This contention is then supported and made more precise as far as the human animal is concerned by examining what has in fact happened with practically isolated human populations in peculiarly favourable although not of course ideal conditions. So "It may be safely asserted, . . . that population, when unchecked, increases in geometrical progression of such a nature as to double itself every twenty-five years" (*Ibid.*, p. 138).

(b) At this stage in every statement of his theory Malthus argues for the conclusion that: ". . . the means of subsistence, under circumstances the most favourable to human industry, could not possibly be made to increase faster than in an arithmetical ratio" (*Second Essay*, Vol. I, p. 10) ; that "by the laws of nature in respect to the powers of a limited territory, the additions which can be made in equal periods to the food which it produces must, after a short time, either be constantly decreasing, which is what would really take place; or, at the very most, must remain stationary, so as to increase the means of subsistence only in arithmetical progression" (*Summary*, p. 143).

(c) He next compares these two powers, of reproduction and production, noticing the utter disproportion between the geometrical progression of the one (1, 2, 4, 8, 16, 32 . . .) and the arithmetical progression of the other (1, 2, 3, 4, 5, 6 . . .). In every statement of his position it is with the help of the observation of this disproportion that he tries to derive the conclusion that there must always be some check or checks operating against the power of reproduction. "By that law of our nature which makes food necessary for the life of man, the effects of these two unequal powers must be kept equal. This implies a strong and constantly operating check on population from the difficulty of subsistence" (*First Essay*, p. 14). So ". . . the power of popula-

tion being in every period so much superior, the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of the strong law of necessity, acting as a check upon the greater power" (*Second Essay*, Vol. I, p. 11). But in the *Summary* he is much more cautious: "it follows necessarily that the average rate of the *actual* increase of population over the greatest part of the globe . . . must be totally of a different character from the rate at which it would increase, if *unchecked* (p. 143; italics original).

(d) "The great question, which remains to be considered, is the manner in which this constant and necessary check on population practically operates" (*Summary*, p. 143). "The natural tendency to increase is everywhere so great that it will generally be easy to account for the height at which the population is found in any country. The more difficult, as well as the more interesting, part of the enquiry is, to trace the immediate causes which stop its further progress. . . . What becomes of this mighty power . . . what are the kinds of restraint, and the forms of premature death, which keep the population down to the level of the means of subsistence?" (*Second Essay*, Vol. I, p. 218). Elsewhere Malthus quotes the question Captain Cook asked of New Holland in his *First Voyage*, "By what means the inhabitants of this country are reduced to such a number as it can subsist?", remarking that "applied generally" it may "lead to the elucidation of some of the most obscure, yet important, points in the history of human society. I cannot so clearly and concisely describe the precise aim of the first part of the present work as by saying that it is an endeavour to answer this question so applied" (*Ibid.*, Vol. I, p. 67).

But of course in addition to this speculative interest in discovering what the checks are and how they have operated Malthus always had a practical concern to find out and advocate what they ought to be and how they ought to operate. It is this concern which directs the whole of the *First Essay* and the second part of the *Second Essay*, and which shows itself repeatedly, not always fortunately, elsewhere. There is no suitably short passage to quote from the former (cf. however pp. 346 ff); but at the beginning of the fourth book of the latter Malthus wrote that taking the operation of some great check as "an inevitable law of nature, . . . the only enquiry that remains is, how it may take place with the least possible prejudice to the virtue and happiness of human society" (Vol. II, p. 255).

(e) In the next stage of his argument Malthus' second were importantly different from his first thoughts. While in both cases

the duality of his interests leads him to mix two quite different systems of classification.

In the *First Essay* the categories "preventive check" and "positive check" are presented as the most important but not as together exhaustive: "a foresight of the difficulties attending the rearing of a family, acts as a preventive check; and the actual distresses of some of the lower classes, by which they are disabled from giving the proper food and attention to their children, acts as a positive check" (pp. 62-3); but "to these two great checks to population . . . may be added, vicious customs with respect to women, great cities, unwholesome manufactures, luxury, pestilence, and war" (pp. 99-100). In the *Second Essay* and after "positive checks" and "preventive checks" are the labels of two, supposedly, mutually exclusive and together exhaustive categories. The former "include every cause [e.g. wars, pestilences, and famines—A.F.] . . . which in any degree contributes to shorten the natural duration of human life" (Vol. I, p. 15). The latter, though the outlines are blurred by the author's delicacy of expression and moral commitments, is complementary. It includes all checks to the birth rate: from "the restraint from marriage which is not followed by irregular gratifications"; through "promiscuous intercourse, unnatural passions" and "violations of the marriage bed"; to "improper arts to conceal the consequences of irregular connections" (Vol. I, p. 16). Elsewhere after "promiscuous concubinage" he brings himself to mention enigmatically "something else as unnatural" (Vol. II, p. 8); i.e. contraception.

But in addition to this method of division he employs a second, cutting right across the first, which is also offered as exclusive and exhaustive, and which is obviously not value-neutral at all. Thus in the *First Essay,* as the sentence immediately following the last passage quoted from this source, he writes: "All these checks may be fairly resolved into misery and vice" (p. 100). And, a little later, "In short it is difficult to conceive any check to population, which does not come under the description of some species of misery or vice" (p. 108). However in the *Second Essay,* as he is at pains to point out in his Preface, he "so far differed in principle from the former, as to suppose the action of another check to population which does not come under the head of either vice or misery; and, in the latter part I have endeavoured to soften some of the harshest conclusions of the first Essay" (Vol. I, pp. vii-viii). The new third category in this trinity is "moral restraint", one of "the preventive checks, the

restraint from marriage which is not followed by irregular gratifi-
cations" (Vol. I, p. 15). With this vitally important modification
the old claim to exhaustiveness is repeated: "the checks which
repress the superior power of population . . . are all resolvable
into moral restraint, vice, and misery" (Vol. I, p. 24).

(f) Finally Malthus makes the point that the values of the
various possible checks do not vary entirely independently: "The
sum of all the positive and preventive checks taken together,
forms undoubtedly the immediate cause which represses popula-
tion". . . . we can certainly draw no safe conclusion from the
contemplation of two or three of these checks taken by them-
selves, because it so frequently happens that the excess of one
check is balanced by the defect of some other" (Vol. I, p. 256).
Although his general statements about the relations between the
various checks considered as variables are usually, like this one,
curiously weak, his particular arguments again and again depend
on the subsistence of far stronger connections. Thus in the *First
Essay* he remarks that Dr. Price's failure, after supposing that
all the checks other than famine were removed, to draw "the
obvious and necessary inference that an unchecked population
would increase beyond comparison, faster than the earth, by the
best directed exertions of man, could produce food for its
support", was "as astonishing, as if he had resisted the conclusion
of one of the plainest propositions of Euclid" (pp. 340-1). Again
in the *Second Essay* he quotes with approval the remark of a
Jesuit missionary that "if famine did not, from time to time, thin
the immense number of inhabitants which China contains, it
would be impossible for her to live in peace" (Vol. I, p. 226).
And the whole force of his argument for his proposals for
encouraging Moral Restraint lies in the contention that this
check might by these means be substituted, to a greater extent
than in modern Europe it had already been, for those others
which he classed as species of Vice or Misery. "If there were
no other depopulating causes, and if the preventive check did not
operate very strongly, every country would without doubt be
subject to periodical plagues and famines" (Vol. I, p. 530).

III

This was the theoretical framework with which Malthus
organized his empirical investigations and on which he based his
policy proposals. We proceed to examine it.

(a) The foundation of the whole theory consists simply in
the proposition that human populations, like those of other living

creatures, have the power to multiply themselves by reproduction; on a conservative estimate, once every twenty-five years (see II (a) above).

Four comments on this basic proposition. *First,* Malthus, in drawing attention to this power, was not of course thereby maintaining that human populations always, or usually, or even ever at all, in fact increase at this rate; though part of his supporting evidence was that for limited periods, under conditions which were temporarily almost but never quite ideal, and which he was himself most concerned to argue must be exceptional, this had indeed actually happened. He states categorically that "in no state that we have yet known has the power of population been left to exert itself with perfect freedom" (Vol. I, p. 4). What he was maintaining was the crucially different thesis that human, like animal, populations would multiply at some such rate if they were not held in check by counteracting forces. It is precisely with these checks that by far the greater part of Malthus' writings are concerned.

It is necessary to labour this point since many of his critics, including some who have read him, have failed fully to grasp it. Thus Kenneth Smith in his elaborate polemic, *The Malthusian Controversy* (Routledge, 1951), remarks that Place's "advocacy of birth control was the beginning of a movement which can completely nullify the geometrical or any other ratio" (p. 325). And later that "Malthus opposed birth control, yet it has become so widespread that where it is practised the notion of a geometrical ratio can have no validity at all" (p. 329). But the spread of birth control has not the slightest tendency to invalidate Malthus' basic principle. Quite the contrary. It is only and precisely to put some check on this power to multiply that contraception is required.

Second, Malthus throughout and explicitly makes the reasonable, but not unquestionable, assumption that sexual desire and the capacities to fertilize and to conceive are constants: thus in the *First Essay* he denies that there has been "a decay of the passion between the sexes. We have sufficient reason to think that this natural propensity exists still in undiminished vigour" (p. 62); and in the *1817 Appendix* he still insists "that neither theory nor experience will justify us in believing either that the passion between the sexes, or the natural prolificness of women, diminishes in the progress of society" (Vol. II, p. 483). The Royal Commission on Population in its *Report* (H.M.S.O., 1949) found in the same sense: "It is just possible that there has been

some decline in reproductive capacity, though there is no positive evidence to this effect; and indeed so far as we know reproductive capacity may well have risen" (p. 34).

Third, Malthus, in defending his basic proposition that human like animal populations possess the power to multiply, and in estimating the rate at which this multiplication would occur if it was not checked, neglected the possible effects of differences in age and sex distribution within these populations. Yet, to take the extreme case, a population entirely of the same sex would possess no power at all to multiply by reproduction. Or again you might have a population equally divided between the sexes but containing such a very small proportion of women of child-bearing age and such a very high proportion of old people that it would be biologically impossible for total numbers to begin to increase until after a period in which they were lower than when they began. While, to take a case which is not fanciful or far-fetched, a population in which young people predominate will possess a greater power of multiplication than an otherwise identical population in which most of the women are beyond the age of child bearing. So Malthus' basic principle needs to be qualified to refer only to human populations in which the age and sex distribution is not freakish; (and henceforward we will take this qualification as read). This is a very rough and ready reformulation. But since a rough and ready formulation is all that Malthus himself was attempting to offer that is all that it is appropriate for us here to attempt. His estimate of the measure of this multiplicative power is similarly approximate; and it was presented as, what it surely is, a minimum. To produce a precise estimate we should need to stipulate precise conditions about the constitution of the populations concerned, and about their marital practices, and perhaps about other things too. It is worth noticing in passing that Malthus always assumed strict monogamy as the norm; although this must 'waste' some reproductive power, as when a fertile woman is married to a sterile husband. Because Malthus only needed and offered an avowedly conservative estimate he was not inconsistent: in suggesting a rate lower than that which he believed some of his evidence indicated had actually at times been reached; while insisting at the same time that the power never does operate unchecked.

Fourth, though we have been talking of "populations" Malthus himself usually talked of "population", took it that what applied to the total world population applied to sections of it and *vice versa,* and met difficulties to which this practice gave rise by

inserting such qualifications as "in the long run". He thus neglected, among other things, the refinements mentioned in the previous paragraph.

(b) The second stage in the construction of the theory is the attempt to establish an upper limit to the possibilities of expanding food production (see II (b) above).

This attempt to define such a limit by a particular arithmetical progression has often and with some reason been attacked as unfounded and arbitrary. The power to multiply is a manifest biological fact; and the estimate of the possible unchecked rate of multiplication as a particular geometrical progression was based on an examination—no doubt not faultless—of population statistics. Whereas the estimate of the limiting rate of increase of food production is supported not by any numerical evidence but rather by an appeal to what "we can imagine that any possible exertions of mankind could make it" (*Second Essay*, Vol. I, p. 10) in the light of the (then) state of "the science of agriculture . . . in England and Scotland" (Vol. I, p. 8). So of the two famous ratios the arithmetical is certainly arbitrary in a way in which the geometrical is not.

But it is proper to emphasize, what Malthus' hostile critics seem rarely to have noticed, that from the first the arithmetical ratio was presented not as a discovery but as a reasonable maximum supposition. In the *First Essay* Malthus writes: "If I allow . . . I think it will be allowing as much as any person can well demand" (p. 21) ; and "Let us then take this for our rule, though certainly far beyond the truth . . ." (p. 22). In the *Second Essay*: "If this supposition be applied . . . and if it be allowed . . . this will be supposing a rate of increase much greater than we can imagine that any possible exertions of mankind could make it" (Vol. I, p. 10). Finally in the *Summary*: "it must be allowable, if it throws light on the subject, to make a supposition . . . which, without pretending to accuracy, is clearly more favourable . . . than any experience we have . . . will warrant" (p. 140).

(c) The third stage is to compare these powers of production with those of reproduction and, with the help of "that law of our nature which makes food necessary for the life of man" (*First Essay*, p. 14), to infer that the latter must always somehow be checked by the former (see II (c) above).

This conclusion cannot validly be inferred from these premises alone. For three reasons. First, because in supposing the arithmetical limit Malthus seems—though unfortunately he

is not nearly as clear and definite as we could wish—to be offering it as an *average*: "considering the present average state of the earth, the means of subsistence, under circumstances the most favourable to human industry . . ." (*Second Essay*, Vol. I, p. 10). But from the permanent subsistence of such a general average limit you cannot deduce that the same limit will be effective in every particular case. Second, because even granting that from these premises you might infer that the power of reproduction *would* always be checked, in the long run, by the limitations of the power of production, if it was not checked by anything else: you certainly cannot infer from them that it is or *will* always be so checked. Not, that is, unless you also know that it never is or will be checked by anything else. But Malthus in the *Second Essay*, on the very next page after he has tried to draw the stronger conclusion, admits the existence of other checks: "causes, independent of this scarcity, . . . which tend prematurely to weaken and destroy the human frame" (Vol. I, p. 12). While there is also the very real possibility, which he nowhere seems to recognize, that married couples may restrain their reproductive power for non-financial reasons. Third, because the two progressions are in step for the first two stages and only begin to diverge at the third (compare 1, 2, 4, 8 . . . with 1, 2, 3, 4 . . .). Thus whenever you suppose them to begin to operate, so long as they begin together, there is bound to be an initial period in which the productive is not checking the reproductive power.

By the time he came to write the *Summary* Malthus seems to have begun to realize that his premises here were insufficient to bear a conclusion as strong as that which he originally attempted to derive from them. His conclusion there is only "that the *average* rate of the actual increase of population over the greatest part of the globe . . . must be totally of a different character from the rate at which it would increase, if unchecked" (p. 143, italics mine).

Perhaps this slowness to recognize and rectify the formal inadequacies of his argument can be partly attributed to the fact that Malthus held that: "the history of every people that have ever existed will abundantly prove . . . that population does invariably increase, where there are the means of subsistence . . ." (*First Essay*, p. 37). Later he claimed that "If every man were sure of a comfortable provision for a family almost every man would have one . . ." (*Second Essay*, Vol. II, p. 6), and that "there is no reason whatever to suppose that any thing besides the difficulty of procuring in adequate plenty the neces-

saries of life, should either indispose . . . persons to marry early, or disable them from rearing in health the largest families" (*Summary*, p. 144). However, while the failure to recognize the fallacies in this argument may be partly attributed to the fact that Malthus held certain propositions, it is presumably also true that he held these partly because they were suggested by his fallacious argument. Guiding ideas may also misguide.

(d) The fourth stage consists in raising the question of how and in what forms "this constant and necessary check on population practically operates" (*Summary*, p. 143) ; and how we ought to adjust to the unchangeable fact that in some form it always will operate (see II (d) above).

We have argued in the previous section that the conclusions which Malthus pretends to derive from a comparison of his two ratios do not follow from his premises as stated. Fortunately to generate his master speculative question this argument is not required, so there is no need for this reason to try to patch it up by adding as further premises any questionable generalizations : about populations always multiplying up to the limits of available subsistence ; or about almost everyone wanting as many children as they can afford. Nor do we need even to make any supposition about the limits of the possibilities of food production. By simply comparing the natural power to multiply at a rate of the order estimated by Malthus with the undisputed facts that actual human populations often rise, sometimes remain stationary, and occasionally fall, but scarcely ever multiply at anything like such a rate, we can infer that some check or checks are usually operating against this power. And if we then notice that even in the exceptional populations in the exceptional periods some people die prematurely and/or without exhausting their procreative possibilities we can conclude not merely that checks are usually operating but that they are operating always. This conclusion gives rise to the necessary master speculative question. And it does this without the false suggestions with which Malthus often linked it, that populations are always at the level of available subsistence and that all checks on reproductive power are due directly or indirectly to food shortage or the fear of it.

Besides the speculative interest there is also the practical concern. The comparison of the ratios is intended to establish at the same time: not only that always and everywhere there have in fact been checks on the power of multiplication "from the difficulty of subsistence"; but also that the operation of checks is a matter of unalterable and universal natural necessity, to which

we must adjust all our political hopes and social policies. Unfortunately Malthus' premises here are inadequate to yield even the second part of this conclusion; for both the first and the third of our objections in III (c) above still apply. Furthermore it is a conclusion which is very likely untrue. For surely there have been, or at any rate could be, populations which, thanks to the unexploited richness of the territory and the technical possibilities available to them, could multiply at the full biologically possible rate for a generation or two without feeling any shortage of the means of subsistence; and this even if that rate is in fact considerably larger than Malthus estimated. So it would probably be wise to be content with trying to establish some such more modest conclusion as that the power of multiplication possessed by any unfreakishly composed human population is so great that it could not be exercised unchecked for very long. This is a conclusion which for the total human population could rest on Malthus' premises; and, given in addition that the maximum possibilities of productive expansion open to any population are not very much greater than the supposed average, it could be extended to cover all lesser populations too.

J. S. Mill, an extremely sympathetic critic, writes of "a passing remark of Mr. Malthus, hazarded chiefly by way of illustration, that the increase of food may perhaps be assumed to take place in an arithmetical ratio, while the population increases in a geometrical", and claims that "every candid reader knows that Mr. Malthus laid no stress on this unlucky attempt to give numerical precision to things which do not admit of it, and every person capable of reasoning must see that it is wholly superfluous to his argument" (*Principles of Political Economy*, 1909 Edition, p. 359). This is far too generous. For the comparison of the two ratios appears prominently in both *Essays* and the *Summary*, and the immediate popular impact of Malthus' ideas on population must be largely attributed to the appearance of "mathematical certainty" which it lent to some of his main theses. While it is certainly not superfluous to his argument if this is to say that the conclusions which he tries to derive in this way are inessential and peripheral. But Mill's assessment of the supposition of the arithmetical ratio is surely just. (One remembers that Malthus was trained at Cambridge as a mathematician.)

Yet even if this misleadingly precise and regular supposition is abandoned it is not difficult to find other ways of supporting the conclusions which Malthus wanted to infer by its aid. Thus one could make calculations, suitably adapted to the structure

and territory of the population concerned, such as those recently presented by Professor W. A. Lewis of Manchester to the Duke of Edinburgh's Study Conference: which showed that if the present world population were to double itself every twenty-five years it "would reach 173,500 thousand million by the year A.D. 2330, at which time there would be standing room only, since this is the number of square yards on the land surface of the earth". As Malthus himself remarked, in another connection: "Though I may not be able, in the present instance, to mark the limit, at which further improvement will stop, I can very easily mention a point at which it will not arrive" (*First Essay,* p. 164).

Even though it may be impossible to establish that there is an irremovable universal general limit on the possibilities of expanding food production, which is and must be always and everywhere operative as a check on the growth of any human population: it is easy to support the weaker, qualified, conclusions that world population could not possibly multiply unchecked for very long; and that even lesser populations in peculiarly favourable circumstances could not do so for much longer.

(e) The fifth stage consists in classifying possible checks on the multiplicative power of populations; and two quite independent sets of categories are employed (see II (e) above).

The first of these, that into Positive and Preventive, is value-neutral: though Malthus' descriptions of some of the members of these two categories are very far from being value-neutral, or even fair. In the *First Essay* they are made to be mutually exclusive but together not quite exhaustive. But in the *Second Essay* Malthus improves on his first thoughts by so extending them that they come nearer to being mutually exclusive and together exhaustive. But they still need a little more tidying up. First, we need to draw the dividing line more clearly: putting it definitely either at conception or at birth. Since Malthus was presumably thinking of induced abortions when he wrote of "improper arts to conceal the consequences of irregular connections" it looks as if, if pressed to indelicate precision, he would have drawn it at birth. This spares us the paradox of counting unborn fœtuses as units of population, though at the price of counting spontaneous miscarriages as preventive while pestilence counts as positive. Second, we should probably amend Malthus' second definition of "positive checks" which "include every cause . . . which in any degree contributes to shorten the natural duration of human life" (*Second Essay,* Vol. I, p. 15) to "every cause of death". The reference to "the natural duration of

human life" serves no useful purpose: it raises unnecessary issues
of definition; it must complicate arguments and calculations made
in terms of the theory; and in any case deaths even in ripe old
age are still checks on the increase of a population. The phrase
"which in any degree contributes" serves only sententiously to
remind that deaths may have remoter as well as immediate causes,
at the cost of making virtually impossible the measurement of the
force of the different checks. This Malthus certainly wanted to
do: "It would be a most curious, and, to every philosophical mind
a most interesting, piece of information, to know the exact share
of the full power of increase which each existing check prevents;
but at present I see no mode of obtaining such information"
(*1806 Appendix*, Vol. II, p. 453 *n*).

When these changes are made the concepts positive check
and preventive check become much less fuzzy: the latter are
checks on the birthrate; while the former are simply causes of
death. It would be fairly easy, though Malthus did not attempt,
to make an exhaustive list of checks in both categories. If
positive checks are made to be just causes of death, measurement
of their relative efficacy presents no theoretical difficulties: while
the prospect of giving quantitative interpretations to the idea of
the force of different preventive checks is now, with the example
of Dr. Kinsey before us, surely not hopeless.

The second set of categories employed to classify checks is
strongly evaluative and prescriptive. The insistence that "All
these [i.e. the preventive, the positive, and the rest—A.F.] checks
may fairly be resolved into misery and vice" (p. 100) determines
the conclusion of the *First Essay* that "any extraordinary
improvement in society" is impossible and that we must eschew
vice and resign ourselves to the inescapable miseries of man's
condition. The introduction in the *Second Essay* of the new
third category "moral restraint" enabled Malthus "to soften some
of the harshest conclusions of the first Essay" (Vol. I, p. viii)
by drawing the more hopeful moral that while still eschewing
vice we may reduce misery by practising and promoting moral
restraint.

In presenting and employing these categories Malthus is
open to every sort of criticism. He was careless, hasty and, by his
own later admission, mistaken in rushing in the *First Essay*,
without listing possible checks systematically, to the conclusion
that they could all "be resolved into misery and vice". Although
he was induced before writing the *Second Essay* to admit a third
possibility he again rashly claims, still neglecting to compile a

systematic list, that his—now extended—set of categories is exhaustive. His definition of "moral restraint" is narrow; the clause "restraint *from* marriage" (italics mine) woodenly overlooks the possibility which Mill was later to urge (*loc. cit.,* Bk. II, Ch. XIII), of restraint *in* marriage; which by one who held restraint from marriage to be neither vice nor misery could scarcely be counted as either. He offers no rationale for this system of classification, which is certainly awkward and unbalanced, since two very general and comprehensive categories are harnessed with a narrow and specific one and which looks arbitrary since there is no obvious reason for expecting it to apply exhaustively. And, of course, he takes it for granted that contraception within marriage is indisputably immoral.

If anyone wished to salvage anything from Malthus' triadic classification, he might divide checks into those beyond human control and those within human control, subdividing the latter into illicit and licit. But this, though it would be an improvement on Malthus, would represent a fairly radical departure from his conceptual framework.

(f) The final stage is to point out that the values of the various checks are not unconnected (see II (f) above).

Though Malthus himself made curiously little of this in his general arguments, once the notions of positive and preventive check have been tidied up it becomes clearly true. For if a population is to remain stable the totals of births and deaths must balance : if it rises, it must be because there are more births than deaths ; and if it is to fall it can only be by a surplus of deaths over births. And if the alternative evaluative-prescriptive classification is made similarly exhaustive the same thing will, *mutatis mutandis,* apply.

IV

Our examination in the previous section of Malthus' conceptual framework has, I think, shown : that he was right when he claimed "I could have intrenched myself in an impregnable fortress . . ." (*Second Essay,* Vol. I, p. vii) ; but that, if he was taking his actual guiding ideas to be unassailable just as they were, he was seriously in error. We are now at last in a position to consider the nature and function of his theory taken as a whole.

(a) The first thing to remark is the simplicity and familiarity of the facts and ideas involved. Malthus introduced no new

concept and embodied no factual discovery in his theory. What he did was to bring together one or two familiar facts of life, make an unfortunately precise and general supposition about a limit on the expansion of food production, and try to deduce the necessary consequences of these facts.   All his demographic investigations were generated by these fairly immediate apparent consequences of a few simple ideas and obvious facts, and all his practical recommendations too were conditioned by them.   In these respects there are interesting similarities between Malthus and Darwin.   For the fundamental facts and ideas in Darwin's theory were also extremely simple and familiar : that all living creatures possess formidable powers of multiplication ; that in general offspring resemble their parents, though there are variations which are often transmitted to at least some of the offspring of the offspring ; that the resources of food and living room available to any species are always limited ; and so on.   From the conjunction of such simple and familiar facts it follows as a deductive consequence that in time there must be a struggle for existence and some evolution.[2]   Of course this similarity is not entirely a coincidence : in his *Autobiography* Darwin tells how he "happened to read for amusement 'Malthus on Population'" (*Life and Letters of Charles Darwin,* Vol. I, p. 83) ; and in the Introduction to *The Origin of Species* he acknowledges that "the Struggle for Existence . . . is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms" (Sixth Edition, p. 5).

(b) The second thing to remark is that the master question which stimulates and guides Malthus' population studies is negative : he is asking why and how something does *not* happen. This question is generated by his fundamental law of population, which states the rate at which population increases, *when unchecked.*   Malthus' theory here bears a certain resemblance to classical mechanics.   For the first law of motion states that : "Every body continues in its state of rest or of uniform motion in a right line *unless it is compelled to change that state by forces impressed upon it*" (*Principia,* Bk. I ; italics mine).   Since in actual fact most, if not all, bodies are in motion relative to some other bodies and this motion never continues for long in a right line the question arises : Why do bodies *not* continue in a state of rest or of uniform motion in a right line, what forces operate

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[2] The point that Darwinism has a deductive core is made by Dr. C. F. A. Pantin in his contribution to *The History of Science* (Cohen and West, 1953), pp. 136-7 ; and Dr. Julian Huxley presents his latest exposition of Darwinism in *Evolution in Action* (Chatto and Windus, 1953, Ch. II) "in the form of two general evolutionary equations".

to prevent this, and how? This similarity again is perhaps not altogether a coincidence: for in the *First Essay* Malthus expresses admiration for "the grand and consistent theory" (p. 159) and "the immortal mind" (p. 363) of Newton; and argues strongly that "the causes of population and depopulation have probably been as constant as any of the laws of nature with which we are acquainted" (pp. 126-7).

This analogy, so flattering to Malthus, should not be pressed beyond the point to which we have taken it. Nevertheless it may suggest two comments. First, it can be used to bring out the unsympathetic perversity of such a criticism as this: "Man cannot live without food. Hence the two ratios would both be arithmetical. What then becomes of the geometrical series? It is reduced to the rate of food production in each period . . . The invalidity of Malthus' ratios could never have escaped detection if he had stated the real series of increase and hence deduced all that it implied" (K. Smith, *op. cit.*, p. 234). One might as well argue that the invalidity of the first law of motion would never have escaped detection if Galileo had stated the real motions of bodies. Later Smith complains: "Although his illustrations and proofs have a first appearance of careful inductive work, the basis of all his ideas is the postulate of the geometrical ratio which he does not find in practice" (*ibid.*, p. 331). The social are scarcely likely to overtake the natural sciences if in them every notion not embodying a description of directly observable fact is to be assailed as invalid and unreal. (In any case, as we have seen in II (a) and III (a) above, the existence of this power of reproductive multiplication is supported by an appeal to evidence as strong and as direct as one could reasonably demand.)

Second, it can be used to bring out how Malthus sometimes failed himself to maintain an adequate level of theoretical sophistication. In the *1817 Appendix* against Weyland he defends his talk of a natural tendency which in fact is always to a greater or lesser extent checked by counteracting forces: by an apt appeal to the practice "of the natural philosopher . . . observing the different velocities and ranges of projectiles passing through resisting media of different densities"; with a confession of inability to "see why the moral and political philosopher should proceed upon principles so totally opposite" (Vol. II, p. 485). Nevertheless he is inclined to misinterpret his contention that the power of populations to multiply is inordinately greater than their capacity to produce food as if it were the same thing as saying,

B

or at any rate involved, that population always does and inevitably
must press hard upon the means of subsistence (see II (c) and
III (c) above). The important difference was brought out well
by Archbishop Whately with his distinction between two senses
of "tendency": that in which a tendency to produce something is
a cause which, operating unimpeded, would produce it; and that
in which to speak of such a tendency is to say that that result
may reasonably be expected in fact to occur (*Lectures on Political
Economy*, 1832, Lecture IX). Substantially the same point had
been made slightly earlier by Nassau Senior in his *Two Lectures
on Population* (1831). It was tacitly and rather grudgingly
accepted by Malthus in the ensuing correspondence, printed as
an Appendix to the lectures: though apparently he never saw its
relevance to his argument from the comparison of the ratios.

(c) The third point to remark is that this conceptual frame-
work was originally built as a practical theory, designed as a
guide to political and social action (or inaction). Though its
fundamental principle generated the speculative question which
Malthus by his own work showed to be of great heuristic value,
it always retained this essentially practical character. Not only
was the evaluative-prescriptive method of classifying checks
always used alongside the value-neutral descriptive one (see
II (e) and III (e) above): but Malthus also throughout retained
the argument of the comparison of the ratios to support simul-
taneously both the speculatively stimulating conclusion that some
checks *are* operating everywhere and the practically crucial con-
tention that there always *must be* checks (see II (c) and III (c)
above). Though Malthus made one vitally important addition,
the category of moral restraint, and various minor alterations in
the *Second Essay* and after, it always remained essentially the
conceptual framework of the *First Essay* with which he
approached all population questions. It should therefore not
surprise us that these ideas are more suited for the rough and
ready understanding of broad trends and for guiding the wide
lines of general policy than for assisting in detailed demographic
analysis. It was, for instance, left to David Booth, one of
Malthus' early critics, to bring out the crucial importance for such
analysis of age and sex distribution and particularly of the pro-
portions of women of child-bearing age (in his 'Mathematical
Dissertation' printed in William Godwin *Of Population*, 1820).
These are refinements neglected by Malthus in his schema (see
III (a) above).

But for the rough and practically vital understanding of the
population explosions now occurring in so many of the under-

developed countries Malthus' simple model of an enormous power of increase opposed by various counteracting forces is perhaps both necessary and sufficient. For it can bring out that in these countries the application of modern medical knowledge is weakening the positive check while nothing is occurring to produce a proportionate strengthening of the preventive check.

And if the fallacious argument of the comparison of the ratios is replaced, as it can most easily be (see III (c) above), by a sound argument for the slightly weaker conclusion that the power of increase is so enormous that it must always be checked in the fairly short run; then Malthusian ideas can be used validly to establish some enormously important general practical conclusions.

Thus if Malthus' facts and arguments, so amended, are correct, and if it is accepted that there can be no right to the physically impossible: then it is surely preposterous to assert or assume that every (married) couple has a right to produce as many children as they wish, regardless of what others may be doing or wanting to do; and that all these children will have a right to support in childhood and as adults to earn a living, to marry and to have a similarly unrestricted right to produce children with similar rights in their turn. Unless you also make the gigantic, utterly unwarranted assumption that the sum of all these separate possible desires will always work out providentially to a practically manageable birth rate. This is a conclusion which Malthus always drew; and its importance can be appreciated by considering how widely and bitterly it was and still is resisted. (For an egregious recent example, from a professional economist turned amateur apologist, see Colin Clark's 'New Light on Population', *Listener,* 26/3/53.)

Thus again, if Malthus is right, it must be unsound in principle to offer as a scheme for raising average standards of living a plan for increasing production unless: *either* you have good independent reason to believe that any parallel increase in population will be less than proportionate; *or* your scheme itself makes provision for securing this objective. This is a conclusion which guided Malthus in all the political and social arguments of the second part of the *Second Essay*: although he is very much open to criticism for his general pessimism and for the narrowness of his ideas about means of securing the necessary check. The importance of this conclusion too can best be appreciated by considering how until Malthus it had been almost entirely overlooked; and how it is still discreetly ignored in so many official

reports and plans dealing with the problems of raising living standards in backward countries. Senior, in his perhaps over-generous summing up of the agreement reached in his controversy with Malthus puts the point judiciously: "no plan for social improvement can be complete, unless it embraces the means both of increasing production, and of preventing population making a proportionate advance" (*loc. cit.*, p. 90).

North Staffordshire University College.

THE INDEPENDENCE OF AXIOMS IN THE PROPOSITIONAL CALCULUS

By G. E. Hughes

My sole aim in this paper is to set out as clearly and simply as I can the standard proof of the independence of axioms by means of "arithmetical models". There is no originality in the paper except in the way in which things are set down, but I think it worth writing because I know that some people (including myself) have been puzzled about how the argument proves what it claims to prove, even though they can follow each individual step.

I shall consider the Propositional Calculus in its best known form, with Russellian axioms, except that I shall write all formulæ in terms of the two operators "∼" and "v" only. We shall thus have no definitions in our calculus; but once we have proved what we set out to prove about our axioms in the form in which we shall write them, we can of course introduce other operators such as "." and "⊃" by suitable definitions, and thus re-write the axioms in a more familiar way, without making any difference to our argument.

I shall refer to the calculus as I shall set it down as "Calculus P" (or simply "P"). It may be summarised as follows:

I. *The Elements*:

(a) Propositional variables: p, q, r etc. These can take two values only, *viz. true* and *false*, which we shall symbolise by "1" and "0" respectively.

(b) Two operators, *viz.*

(i) "∼": negation, a monadic operator, *i.e.* one which forms a new propositional formula out of *one* other given propositional formula (simple or complex). We shall give a definition of this operator, not in the sense of "definition" used above (not, *i.e.*, by defining it in terms of other operators), but by explaining the effect of the operator on the value of the formula to which it is

prefixed. Our definition is that its effect is to change the value of the formula from 1 to 0 or from 0 to 1; and we can express this by the table

	~
1	0
0	1

in which the left-hand column represents the value of the original formula, and the right-hand column that of the same formula with "~" prefixed to it.

(ii) "v": disjunction, a dyadic operator, *i.e.* one which forms a new propositional formula out of *two* other given propositional formulæ (simple or complex). We shall define this operator by means of the table

v	1	0
1	1	1
0	1	0

where the left-hand column represents the value of the first disjunct, the top row that of the second, and by reading across and down we find the value of the whole formula.

II. *Formation Rules.* These are rules for the construction of "meaningful" or "well-formed" formulæ (WFF's) out of the elements of the calculus, as distinct from meaningless strings of symbols like "~vp~q". They are:

(a) Any individual propositional variable is a WFF.

(b) The negation of any WFF is a WFF.

(c) The disjunction of any two WFF's is a WFF.

Nothing which is not constructed in accordance with these rules is to count as a WFF in P.

III. *Axioms.* We shall use a Russellian set, written with our two operators only:

PA1. ~(pvp) v p
PA2. ~q v (pvq)
PA3. ~(pvq) v (qvp)
PA4. ~(~qvr) v [~(pvq) v (pvr)]

(The bracketing conventions used in writing these axioms will I think be sufficiently obvious.)

IV. *Transformation Rules.* These are rules for the derivation of theorems from the axioms. Any formula obtained from

the above axioms by the application of either or both of these rules is to count as a theorem in Calculus P.

PT1. If in any axiom or already derived theorem any WFF is substituted for any individual propositional variable *throughout,* the resulting formula is a theorem. (The Rule of Substitution.)

PT2. If P is an axiom or already derived theorem and ∼PvQ is an axiom or already derived theorem, then Q is a theorem. (The Rule of Inference or Detachment.)[1]

(The symbols "P", "Q" etc. are here used as metalogical variables, which can take as their values any WFF in Calculus P.)

The problem: To say that a given axiom in P is independent of the other axioms is to say that no application or series of applications of the transformation rules to these other axioms could ever yield the axiom in question as a theorem. The problem is therefore to prove in turn of each of the four axioms that it is, in this sense, independent of the other three. Clearly this cannot be proved by making all the possible derivations from three of the axioms which the transformation rules permit, and then checking that the fourth axiom is not among them; for the transformation rules would permit the derivation of an infinite number of theorems from the three axioms.

Some other method of proof must therefore be found. But in following through the stages of such a proof one important fact must be borne in mind, and that is that our rules PT1 and PT2 are rules for the manipulation of *symbols* and that they make no reference to the interpretation of those symbols. No doubt we do in fact interpret the symbols (we interpret "p" as a *propositional* variable, "∼" as meaning "not", and so on), and no doubt in many contexts it is important to do so; but the point is that we can correctly apply PT1 and PT2 without making any such interpretation, provided only that we recognise "p", "q", "r" etc. as *variables* of some kind, "∼" as a monadic operator of some kind, and "v" as a dyadic operator of some kind, and that we can distinguish WFF's from expressions which are not WFF's (and the rules for constructing WFF's are themselves expressed

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[1] Some text-books of Symbolic Logic (*e.g.* Ambrose and Lazerowitz's *Fundamentals of Symbolic Logic* and Basson and O'Connor's *Introduction to Symbolic Logic*) give a third transformation rule alongside the two stated here, *viz.* the Rule of Adjunction, which may be stated as follows: If P and Q are each of them an axiom or an already derived theorem, then ∼(∼Pv∼Q) [*i.e.* P.Q] is a theorem. This rule, however, can easily be shown not to be independent of PT1 and PT2; *i.e.* any result which we could obtain by means of it we could equally well obtain by a series of applications of PT1 and PT2.

in terms of how to combine *symbols,* with no reference to their interpretation).

We shall consider first the simpler problem of proving that PA1 is independent of PA2.

To prove this we shall construct *another* calculus (which we shall call "X"), which will be in some ways analogous to P and in some ways not. X may be outlined as follows:

I. *The Elements.*

(a) Variables: we shall use the symbols "x", "y", "z" etc. as variables, and this time they may take any one of the three values 0, 1 and 2. We shall not interpret the variables in any way beyond that, nor shall we discuss the question of whether they could be interpreted or what their interpretation would be like. We are not regarding them as *propositional* variables, nor are we interpreting the values 0, 1 and 2 as numbers, or as truth-values, or as anything in particular. All we are saying is that when in X we write any variable-symbol, say "x", this may have the value 0, the value 1, or the value 2, must have one of these, and cannot have more than one. (We might have written any symbols, say "‡", "§" and "✸", instead of "0", "1" and "2".)

(b) Two operators, one monadic and the other dyadic, for which we shall use the arbitrary symbols "*" and "†". We shall define these operators (in the sense in which we defined the operators in P) by means of the following tables:

	*
0	1
1	0
2	2

†	0	1	2
0	0	0	0
1	0	1	2
2	0	2	0

These tables are to be understood in the way we explained in connection with the defining tables for the operators in P.

II. *Formation Rules.* These will exactly parallel the formation rules of P. They are:

(a) Any individual variable is a WFF.

(b) Any WFF preceded by "*" is a WFF.

(c) Any two WFF's with "†" between them, constitute a WFF. Once more, nothing which is not constructed in accordance with the above rules is to count as a WFF.

III. *Axioms,* or (if that term be objected to) *Commencement Formulæ.* These will again be analogous to the axioms of P.

XA1. *(x†x) † x
XA2. *y † (x†y)
XA3. *(x†y) † (y†x)
XA4. *(*y†z) † [*(x†y) † (x†z)]

IV. *Transformation Rules.* Once more these will be analogous to those of P. We shall use the phrase "derived formula" instead of the word "theorem".

XT1. If in any commencement formula or already derived formula, any WFF is substituted for any individual variable *throughout,* the resulting formula is a derived formula.

XT2. If X is a commencement formula or an already derived formula, and so is *X†Y, then Y is a derived formula.

(Brackets are used in X exactly as in P. "X", "Y" etc. are used as second-order variables analogous to the metalogical variables "P", "Q" etc. in P.)

Now X is *not* the propositional calculus. For (a) its variables are not *propositional* variables; and (b) its operators are *not* the operators which we commonly interpret as "not" and "or": indeed they have been given definitions which *exclude* their interpretation as "not" and "or" in any natural sense at all. Yet clearly X is a calculus of some kind, in that we are given rules for what sets of symbols to write down and what sets not to write down, and rules for deriving one set of symbols from another. Moreover, X is analogous to P in the following respects: Suppose we call any expression which is obtained from a formula in P by writing "x" instead of "p", "y" instead of "q", and so on, "*"" instead of "∼", and "†" instead of "v", the *analogue* of that formula; then

(a) The analogue of every WFF in P is a WFF in X;

(b) The analogue of every axiom in P is a commencement formula in X; and

(c) Whenever in P a formula is derivable from a certain axiom or a certain set of axioms, the analogue of that formula is derivable in X from the analogue of that axiom or the analogues of those axioms. In other words, there is a one-to-one correspondence between the class of formulæ derivable from a given axiom in P and the class of formulæ derivable from the analogous commencement formula in X.

Indeed, if we were to omit our definitions of operators, we might say that X would *be* the propositional calculus; or, more accurately, that X could then serve as a symbolic expression of the propositional calculus, or could be given a propositional interpretation, just as readily as could the more familiar symbolism of P.

Now let us consider the question of the independence of axioms in X, and in particular XA1's independence of XA2. We shall show that XA1 could not be derived from XA2 by any series of applications of the rules XT1 and XT2. The proof may be set down as follows:

Our definitions of operators in X enable us to construct tables (on the model of ordinary truth-tables, only they will not be *truth*-tables) for any WFF in X. The tables for XA1 and XA2 will be constructed as follows:

XA1:

*	(x	†	x)	†	x
I	0	0	0	0	0
O	I	I	I	0	I
I	2	0	2	2	2

I.e. the table for XA1 is 002.

XA2:

*y	†	(x	†	y)
I	0	0	0	0
O	0	0	0	I
2	0	0	0	2
I	0	I	0	0
O	0	I	I	I
2	0	I	2	2
I	0	2	0	0
O	0	2	2	I
2	0	2	0	2

Thus the table for XA2 consists entirely of 0's.

Now it can be shown that *every formula which is derivable by XT1 and/or XT2 from a formula in X which has a table consisting entirely of 0's, will itself have a table consisting entirely of 0's.* Putting it the other way round, if we have a formula whose table does *not* consist solely of 0's, this formula could *not* be derived by the transformation rules from one whose table does consist solely of 0's. And if we can demonstrate this, we

thereby show that XA1 could not be derived from XA2, for the table for XA1 does not consist solely of 0's, while that for XA2 does. (In what follows we shall for shortness write "=0 throughout" for "has a table consisting solely of 0's.")

The demonstration of the statement italicised in the last paragraph is as follows:

Consider XT1. This allows us to substitute any WFF for any individual variable, provided we do so wherever that variable occurs in the formula. Now our formation rules, together with the definitions of the operators, guarantee that any WFF will have the value 0 or the value 1 or the value 2, but not any other value and not no value at all. Suppose the variable for which we are substituting the WFF is x. If the whole formula in which we are making the substitution =0 throughout, this means that it will have the value 0 whether x has the value 0, the value 1 or the value 2, whatever values the other variables may have. So whatever WFF we put in the place of x, the whole formula will still have the value 0. And the same will of course apply in the case of any other variable as well as x.

Now consider XT2. This says that if we are given (or have derived from what we are given) (a) a formula X, and (b) another formula *X†Y, we are entitled to regard Y as a derived formula. In the case we are considering, what we are given is a formula or formulæ each of which =0 throughout. Now in our *first* application of XT2, X and *X†Y must each be one of these given formulæ, or else derived from one of them by XT1. So we shall have   X=0 throughout
            and   *X†Y =0 throughout.
Now if X=0 throughout, then (by our definition of "*") *X=1 throughout. But if *X=1 throughout and *X†Y =0 throughout, it follows (by our definition of "†") that Y=0 throughout, which was the point to be proved. And on the second application of XT2, X and *X†Y must each be either (i) one of the originally given formulæ, or (ii) one derived from one of them by XT1, or (iii) one derived by a previous application of XT2 to formulæ of types (i) and/or (ii) ; and the foregoing argument applies again. And so forth.

We have therefore shown that any formula which is derived by either or both of the transformation rules from a formula which =0 throughout, or from a set of formulæ each of which =0 throughout, will itself be =0 throughout. And therefore we have proved in particular that XA1 — *(x†x) † x — cannot be derived from XA2 — *y † (x†y) — by the transformation rules of X.

But (to return to Calculus P) we said previously that XA1 is the exact analogue of PA1 and that XA2 is the exact analogue of PA2; and that the formulæ which can be derived from PA2 by the transformation rules of P are exactly those whose analogues can be derived from XA2 by the transformation rules of X. Hence if XA1 cannot (as we have just shown) be derived from XA2, it follows that PA1 cannot be derived from PA2.

The full independence proof for PA1—the proof that it is independent of PA2, PA3 and PA4—is now easy. For it will in fact be found that if we construct tables for XA3 and XA4 (the analogues of PA3 and PA4), they, like that for XA2, consist solely of 0's. The arguments we have already used will therefore also show that XA1 could not be derived from XA3 or XA4 any more than from XA2, or from any combination of XA2, XA3 and XA4; and consequently PA1 cannot be derived from any combination of PA2, PA3 and PA4.

Calculus X cannot of course be used to prove the independence of PA2 from PA1, PA3 and PA4. To prove *that,* we have to construct a further calculus which will be like X in that it will resemble P in those respects in which X resembles P, but unlike X in that its operators will be differently defined. We have in fact to find a new pair of operators, one monadic and the other dyadic, (a) such that the table for the analogue of PA2 in this new calculus will contain a value which does not appear in any of the tables for the analogues of PA1, PA3 and PA4; and (b) such that we can prove that no application or series of applications of the transformation rules to a formula or formulæ whose tables do *not* contain that value, could yield a formula whose table does contain that value. (It is not necessary, it may be added, that the tables for the three axioms should have the same identical value throughout, though this happened to be the case in calculus X.)

The tasks of proving the independence of PA3 and PA4 are of course of a similar nature.

There is no ready-made recipe for discovering the operators we need to prove the independence of a given axiom. We have to hunt for them, and the fact that we have failed to find them in a given finite time is no guarantee that no such operators *can* be found; for there is an infinite number of possible operators which we can choose to investigate. The search would be a finite one (in the sense that we could exhaustively survey the field in a finite number of steps) if we were confined to the use of three-valued operators only (for of these there are only 27 monadic

and 729 dyadic ones) ; but we may not be able to discover three-valued operators with the properties we are looking for, and then we have to try four-valued ones, and so on. Operators which can be used to prove the independence of PA2, PA3 and PA4 have, however, been discovered. Hilbert and Ackermann (*Mathematical Logic*, § 13) give the following set (four-valued in each case) :

For PA2:[2]

	*
0	I
I	0
2	3
3	2

†	0 I 2 3
0	0 0 0 0
I	0 I I I
2	0 I 2 2
3	0 I 2 3

For PA3:

	*
0	I
I	0
2	0
3	2

†	0 I 2 3
0	0 0 0 0
I	0 I 2 3
2	0 2 2 0
3	0 3 3 3

For PA4:

	*
0	I
I	0
2	3
3	0

†	0 I 2 3
0	0 0 0 0
I	0 I 2 3
2	0 2 2 0
3	0 3 0 3

The *disproof* of the independence of an axiom would proceed by the construction of a proof of that axiom by deriving it from the remaining axioms in accordance with the transformation rules. As is well known, the fourth of the original set of five axioms in *Principia Mathematica* was subsequently proved in this way not to be independent of the other four.

Victoria University College.

THE THOMIST PROOFS OF THEISM

By G. Stuart Watts

The *Quinque Viae* of St. Thomas Aquinas represent the high-water mark of the attempt made by Christian thinkers in the West to adapt Greek philosophy to the requirements of theological dogma. Certainly, no other equally significant thesis along those lines is being worked out to-day. Neither in modern Augustinianism nor in the "Lutheran *Summa*" of Paul Tillich— to mention two other major systems of theistic metaphysics—is there the same sensitiveness to empirical fact as the basis of metaphysical reasoning, or the same concern to present a case along rigidly logical lines, without recourse to "truths of revelation".[1] Yet, despite the good intentions of Thomism, its metaphysics is insecurely based in experience and, in particular, its theistic proofs, after careful scrutiny, turn out to be *theological,* rather than philosophical, arguments. Of the two major works in which St. Thomas outlines his Five Ways, the *Summa contra Gentiles* deals with both philosophical and theological questions; while the *Summa Theologica* was written, as St. Thomas himself tells us, to provide a systematic and summary account of theology for "novices" in that subject. As Fr. F. C. Copleston, S.J., points out, "neither *Summa* can be called a philosophical treatise".[2] The predominantly theological interest of St. Thomas is emphasized by the same author in his *History of Philosophy*, where the philosophical weaknesses of the Saint's arguments are excused on the ground that he "was primarily a theologian", whose object was not to present a full philosophical discussion of the theistic proofs but rather to give a summary proof of the *praeambuli fidei*. In doing this, St. Thomas used the traditional proofs, which at least *appeared* to be based on Aristotle; and, although he

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[1] Modern Augustinianism remains entangled in intuitionism, whence, with the aid of the Ontological Argument, it derives a "logic of the singular" which is also "a mystical logic of love—yet at the same time a profoundly rational one" (Dr. Langmead Casserley, *The Christian in Philosophy*, 1949, p. 233). "God is not known through nature but nature is known in God" (*op. cit.*, p. 59). Tillich's rationalism exceeds even that of Thomism: for him, God is not only "being-itself" (*ipsum esse*) pure being, etc., but one who is so far *above* existence that it is atheistic to speak of his existing at all. Finite being is a question mark requiring the answer, God (*Systematic Theology*, I, 1951, ch. X). Both the Thomist and Tillich darken counsel by combining in the same sentence abstract and concrete terms, as though the former *added* something to the sense of the latter.

[2] *Aquinas* (Pelican Books, 1955); p. 12. Copleston admits that this absence of any systematic philosophic treatise makes it difficult to study Aquinas's philosophy in his own works, entirely apart from Christian theology.

gave priority to the First Way (the Argument from Motion),
calling it the *via manifestior,* the fundamental proof is really the
third (the Argument from Necessary Being). In the same work
Copleston says: "It might seem to be rather cavalier behaviour
on his part to assume that the unmoved mover or the first cause
or the necessary being is what we call God. . . . I think that we
must admit that the actual phrases which St. Thomas appends to
the proofs given ·in the *Summa Theologica* (*et hoc omnes
intelligunt Deum, causam efficientem primam quam omnes Deum
nominant, quod omnes dicunt Deum*) constitute, if considered in
isolation, an over-hasty conclusion; but apart from the fact that
the *Summa Theologica* is a summary (and mainly) theological
text-book, these phrases should not be taken in isolation."[3] The
soundness of this judgment is attested by an attentive study of
the two *Summae.* St. Thomas was concerned only incidentally
with philosophy: he was trying, with its help, to clear the ground
for and to establish the foundations of the Church's dogmatic
system. It is this "rather cavalier behaviour" towards philosophy
which the non-Thomist inquirer finds profoundly disturbing. Only
a philosopher with urgent theological needs would leap, *e.g.,* from
the universal category of causality to a being who is himself
independent of that category (and, indeed, of all categories)
and yet is the cause and sustainer of all other beings. Philosophy
is abandoned in favour of theological advocacy when the former
is conceived as fulfilling "a humble and ancillary" service to the
Church, whose privilege it is, "in its knowledge of union and
love, to pick and choose from the best thought of the world what
records and orchestrates the divine mystery".[4]   For Jacques
Maritain, philosophy is subject to the magistracy of faith;[5] while
for Dr. E. L. Mascall it is "a great dignity" for philosophy to be
theology's handmaid, "*awed into silence*" by the glory confronting
her.[6] Utterances of this kind clearly illustrate the predominantly
theological concern of Thomism, inherited from St. Thomas
himself. It is perhaps most evident in St. Thomas's attempt to
merge the static divine being of Aristotle with the intensely

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[3] Vol. II (1950) ; pp. 345, 342-3.

[4] Fr. M. C. D'Arcy, "Philosophical Pluralism and Catholic Orthodoxy",
The Month, Vol. IV, No. 1. It remains for an Augustinian opponent of
Thomism, however, to assign an even lowlier status to philosophy as
charwoman to theology, yet enjoying her own lodgings and way of life,
except when called upon to perform menial offices for theology!   (Dom
Illtyd Trethowan, *An Essay in Christian Philosophy,* 1954.)

[5] *St. Thomas Aquinas* (1931), pp. 129-130.   Here Maritain echoes the
Vatican Council's declaration that "faith is above reason" (Dom Cuthbert
Butler, *The Vatican Council* (1930), II, p. 265).

[6] *He Who Is* (1943), p. 198; my italics.

personal God of the Jews and early Christians. Following this attempt, towering metaphysical structures have been erected by Thomists upon a very questionable exegesis of certain Old Testament passages, thus placing upon Hebrew poetry and history mixed with folklore a weight greater than they can bear. An outstanding example is the use made by Étienne Gilson[7] and others of the revelation to Moses of the divine name, *ehyeh asher ehyeh*,[8] which is mistranslated "I am that I am", or "I am because I am", and is then virtually identified with the Greek technical terms for being, τὸ ὄν, τὸ ὄντως ὄν. The Five Ways take their starting-point from this text which, according to Gilson, although not itself metaphysics, yet gives rise to metaphysics. The sense of the Hebrew words in question is surely "I will be what I will be", since the root meaning of the verb *hayah* is "becoming", not "being": the imperfect tense indicates activity and a process which is still not completed.[9] The name Yahweh thus means "He will be", and would be more fittingly applied to a limited, struggling deity—*i.e.*, to a deity *within*, not above, the historical process—than to the eternally self-subsistent, changeless, impassible One of orthodox theology.[10] The shadow of an authoritatively prescribed dogmatic system lies over Thomism and every other theoretical system which acknowledges "the magistracy of faith". As Gilson puts it, when the believer philosophizes, the Faith is always there, and any conflict between a man's faith and his philosophy is a sure sign of philosophic error. Principles must then be re-examined and conclusions checked until he discovers the mistake that vitiates them.[11] The possibility that the Faith itself may be in error is one which Gilson does not entertain. Thus, while criticism may for a time enjoy a limited autonomy, on all matters which impinge on theology the last word is reserved for authority. Once this fact of the pre-eminence of dogmatic interests in St. Thomas's thought is grasped, the philosophical defects of his Five Ways become less puzzling; but the melancholy results of his readiness to accept gifts from hostile hands remain as a warning to theologians: *timeo Danaos et dona ferentes!*[12]

[7] *God and Philosophy* (1941); *The Spirit of Mediaeval Philosophy* (1936).

[8] *Exodus* 3: 13-15.

[9] A. S. Peake, *Commentary, ad. loc.*; S. Davidson, Hastings' *Dictionary of the Bible*, II, p. 199.

[10] It is only fair to point out that some Thomists, *e.g.*, Mascall, are more sensitive to the findings of biblical criticism and rest their theistic metaphysics upon an evolutionary view of biblical notions of God.

[11] *S.M.P.*, p. 6.

[12] Copleston admits that St. Thomas's synthesis of Christianity and Aristotelianism was "rather precarious" (*op. cit.*, p. 424).

Curiously enough, the Thomist theistic proofs are based, not upon the being of God but upon his effects. This is surprising, in view of the Thomist insistence upon God as the eternally self-existent, self-sufficient, "wholly other" being who was under no necessity to create the universe. There is only one argument which restricts itself to God's being in trying to prove his existence, the so-called Ontological Argument, originally outlined in two different forms by St. Anselm.[13] This proof is rightly rejected as invalid by Thomists, following St. Thomas himself, and therefore need not detain us here. Yet this discredited proof is the only classical theistic argument which sees clearly what is required, and accordingly attempts to base itself not upon the universe but upon God himself.[14] In falling, it is the metaphysical Samson which drags down the entire orthodox structure and involves it in its own ruin.

Rejecting the Ontological Argument as beginning and ending with the mere *concept* of God, St. Thomas tried to mark out five ways in which the universe implies God and makes it necessary for us to believe in him. When we examine these Five Ways closely, we shall find that they are not five separate arguments for theism, but five aspects or forms of a single argument, that no less than the Ontological Argument they fail to rise from the concept of God to the being of God, and that, consequently, they must be abandoned if progress in inquiry is to be made. At best, they would prove only the existence of an impersonal deity, or deities, resembling rather the Prime Mover (or Movers) of Aristotle's own philosophy than the God of Christian orthodoxy. And, in its turn, Aristotle's Prime Mover resembles rather the Platonic Form of the Good than the Judaeo-Christian God. For the Prime Mover is not an active Creator; but one who, while remaining unaware of the world's existence (since awareness of imperfection would itself be an imperfection), attracts the world to himself (or itself), and in that way supplies a dynamic towards perfection.

The appeal to God's effects—the universe—breaks down; for if we assert that they do not exist apart from God, that only by the constant exercise of the divine sustaining power do they remain in being, then they have no distinguishing features of their own and so do not exist. If, however, we assert that they exist apart from God, then it follows that God must be limited and

[13] For a recent examination of these two forms, see D. P. Henry, "The *Proslogion* Proofs", *Philosophical Quarterly*, Vol. V, No. 19.

[14] See Dr. R. P. Anschutz, "Four Men Talk about God", this *Journal*, Vol. XII, Nos. 2, 3.

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influenced by them, just as he limits and acts upon them. It might be argued that God, in creating, performed a κένωσις, or self-emptying, voluntarily limiting without in any way renouncing his all-sovereign power, in order that his creation might enjoy a relative independence. But would not that be a mere sham and not independence at all? This question of dependence is fundamental in Thomism, as we shall see later. So far as any significance at all can be assigned to the notion of "relative independence", it would be nothing more than nonentity represented as entity: things would not have their own characteristic ways of behaving and so would not be able to interact with that which constantly maintains them in being. The orthodox view is that an occurrence would collapse into non-existence the moment the divine support was withdrawn. Apart from the entire absence of evidence for such assertions, there would be no collapse of creatures into non-existence, for, on the orthodox thesis, nothing but God would exist. If God is being itself, then, logically, there is nothing apart from God. And if all power is with God, then there is nothing apart from him upon which that power could be exerted; for power or force is a relation between entities. There could be no opposition to an all-powerful being; hence, nothing would evoke that power, and there would be no being to exert it. (These are instances of the way in which Thomism leads logically through pantheism to atheism.) If a thing has its own characteristics, then, whatever its origin and its relation to other things, it is not maintained in being by anything else. If we could suppose it to lack features of its own, and to be entirely dependent upon the self-existent, self-sufficient One, then it could not prove the existence of that One, for it would not exist.

In what follows, I propose to examine briefly the three major Thomist *a posteriori* proofs, the Arguments from Motion, Causality, and Contingency, which may fairly be called different aspects of the one Cosmological Argument, though this term is often restricted to the Third Proof. The two less important arguments (which also, like the others, are aspects of the Cosmological Argument)—the Henological Proof, or argument from degrees of being and of good, and the Teleological Proof or argument from design[15]—will be dealt with incidentally, since space does not permit a fuller treatment; and, in any case, the

significant issues which they raise emerge in discussion of the first three proofs.

1. *The Kinetological Proof,* or Argument from Motion, St. Thomas's *via manifestior* of theistic proof, considers motion as a passing from one form of being to another; that is, as *becoming,* rather than being; and as synonymous, in its widest sense, with change. In motion or change potentiality becomes actuality by the operation of something already in act: *e.g.,* fire, which is actually hot, makes wood, which is only potentially hot, to be actually hot. By doing this, fire moves and changes wood. There is, therefore, a Being who moves and changes all things, yet is himself unmoved, because he is the actuality of all things.[16]

This argument is shattered by the empirical fact that neither actuality nor "potentiality" is encountered apart from change. In the process of changing, novel features emerge; for the end of a process is not hidden or "potential" in the beginning. In fairness to the Thomist, it must be pointed out that he tries—unsuccessfully, in my opinion—to dissociate himself from the view that potentiality is a kind of indefinite actual being concealed in the object. He argues that potentiality cannot be conceived in itself but only "by means of the act with which it is correlated". It "is capacity for the realization of some perfection"; and this realized perfection is the "act" or realized actuality, the thing which is achieved by the operation. A billiard ball at rest is immobile, but it is not immovable: it is capable of being moved; it has in itself the capacity for motion, the potentiality for movement. Clay is potentially any of the things into which it may be fashioned. "This potentiality is something real. The bowl is really in the clay, not indeed actually but potentially. Otherwise, the potter would try in vain to make a bowl out of it. We cannot make a bowl out of water, because water has not in it any potentiality in regard to such an object." I have given these extracts from a very able—and very orthodox—Anglican Thomist, Dr. H. S. Box,[17] so that the doctrine of potentiality may be stated fairly before it is criticized. If we ask, Is potentiality in being?, Dr. Box's answer is that it is "mid-way between being and not-being"; "more than nonentity, but less than the achieved real thing". Now this is an unnecessarily mystifying and cumbersome way of speaking about potentiality. Stripped of metaphysical adornments, all that "potentiality" amounts to is this: an entity exists

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[16] "The essential point is that God does not merely initiate the motion but sustains it, and the weakness of the First Way is that it fails to make this clear" (Dr. E. L. Mascall, *Existence and Analogy,* 1949, p. 75).
[17] *The World and God,* 1934 (pp. 88, 89).

which, if certain conditions are fulfilled, will change into something else. There is no need whatever to have recourse to confused notions of a state "mid-way between being and not-being": a thing either is in being or it is not. The "something real" is not the "potentiality" of the Thomist but actual entities and their interaction. The bowl is *not* "really" in the unshaped clay, whether actually or "potentially". Granted certain types of interaction, the clay will be fashioned into a bowl; but we do not attempt to make bowls out of water, because experience has taught us that it would be useless to try.[18] The Thomist tries hard to avoid the accusation of occultism, of holding that there is some indefinite thing hidden in the object; but he lays himself open to it by speaking of potentiality in the way that we have criticized. Empirical observation can find nothing "metaphysical", occult, or "beyond experience" in natural developments; there is no mysterious unfolding of an end which somehow was there from the beginning, no transition from not-being through something a little more than not-being, to being itself. But even if we could observe the Prime Mover initiating or sustaining change, the things which he changed would be distinct from him, otherwise he would have nothing to work upon; hence they could not be "explained" in terms of the Prime Mover. And, in his relationships with them, he would not only change them but would himself be changed by them. That is why some modern theists, who realize this, refuse to speak of God as a cause, since this would imply either a change in something other than God, already existing, or else a change in God himself, who by that act would pass from a state of non-creativeness to one of creativeness.[19]

The Law of Inertia in modern physics, anticipated by William of Ockham in his criticism of Aquinas's First Way, is adduced by Whittaker as a decisive refutation of St. Thomas's Argument from Motion.[20] Yet it would not add a single cubit to the stature of that argument if the law were disproved to-morrow. For if it were true that no entity is in motion except through the influence of some other thing, this would simply mean that things interact, and would not in the least imply the existence of a First Mover (or Movers) to initiate the process of interaction, on the

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[18] See the incidental but illuminating remarks about potentiality by Professor John Anderson, "Freudianism in Society", this *Journal*, Vol. XVIII, No. 1. Dr. Mascall frankly admits that, "like most of the concepts that Thomism has adopted, the notions of potentiality and act do not ultimately *explain* anything" (*op. cit.*, p. 43, his italics).

[19] Professor G. Dawes Hicks, *The Philosophical Bases of Theism* (1939), p. 176.

[20] Sir Edmund Whittaker, *Space and Spirit* (1946), pp. 45-47.

ground that things could not exist at all without it. One could begin to make out a plausible case for an existence which did not imply motion and change only by postulating the Parmenidean One, and the *reductio ad absurdum* of Pythagoreanism which it effected by showing that the intervals between the units must themselves also be units, and so ruling out all possibility of diversity, motion and change.

2. The *Aetiological Proof,* or Argument from Efficient Causality, may be stated briefly in this way. It begins with our experience of things acting, and of their dependence on other agents for their existence and their causal activity. There is thus in the world an order of efficient causality, an interrelation, of varying degrees of complexity, of causes and effects. A thing cannot cause its own existence. It is impossible that the sequence of efficient causes should extend to infinity : that a series of causes, each of which depends for its existence on another cause, should be infinite. The conclusion, so it is asserted, is inescapable : there exists a First Cause, itself uncaused, which yet is, directly or indirectly, the cause of everything apart from itself. And to this First Cause, "everyone gives the name of God".

When we scrutinize this proof, however, we see that it is merely an example of question-begging. It asserts that the very existence of causation implies a First Cause, thus assuming the very thing which it is supposed to prove. This is admitted by some Thomist philosophers, *e.g.,* by Fr. John Horgan.[21] The fact that a thing cannot cause its own existence does not necessitate a belief in an "Uncaused Cause", whatever that may mean. On the contrary, it exposes the illogicality of such a belief ; and it shows, further, that the attempt to place God outside and above all classes and categories makes nonsense of any attempt at logical thought. Just when we have recognized causality as a universal condition of existence, the theologically minded philosopher tells us that although our reasoning is perfectly valid so far as mere *creatures* are concerned, there is one tremendous exception which it leaves out of account : the Creator is entirely above and completely distinct from every genus, and is himself exempt from the law, which applies to the cosmos, that every event must have a cause. These large exceptions remove God from the logic of situations to the region of the unintelligible and the unutterable. A man can continue as long as he wishes with this

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[21] "The Proof for the Existence of God", *Philosophical Studies* (Maynooth, Eire), II, p. 71 : "The principle of causation in its absolutely universal sense cannot be a premise in the proof for God, since it is equivalent to the conclusion, and to this extent the critics are right."

game of making exceptions to universal categories; but he will play alone, for logic will long since have deserted him.

It is maintained by Thomists that the notion of efficient causality arises as a result of our asking *why*, and not merely *how*, things occur. And this Proof from Efficient Causality is concerned primarily with causes which keep things in being (causes *in esse*), not with causes which bring things into existence (causes *in fieri*). "It must be stressed", Dr. Mascall says, "that a cause is needed for the continued existence of a being just as much as for its original production. If the question 'Why did it begin?' needs answering, so does the question 'Why does it go on?', and just as it would be maintained that unless something had produced it it could not have begun to be, so also it must be maintained that unless something was preserving it it would collapse into non-existence. . . . We are not, therefore, arguing about a chain of causes stretching back into the past, but about a chain of causes existing in the present and each depending on the one beyond." Nor are we trying to reach a first member of the series who differs from other members only in that he is first : the Cause must be outside the series if the series itself is to exist; and this would be so even if the causal chain itself had an infinite number of members. "The argument in its essence is simply this: that in the world we find any number of causes of things, but they all demand causes for themselves. We must therefore either give up philosophizing altogether or admit the existence of a Cause which does not require a cause for itself." [22]

The tendency of the Thomist proofs to run into one another has often been noted; and the above formulation of the Second Proof shows very clearly that it is only another aspect of the Cosmological Argument or the Proof of Necessary Being. Much as Thomists would dislike this way of putting it, their theistic position rests uneasily upon something that might fairly be called "occult"—a mysterious first cause, necessary being, something "other", "higher" than empirical entities. The questions "*why* did it begin?", "*why* does it go on?", will receive only an occult answer, for philosophy and science have none to offer, outside the very restricted field of human purpose. Philosophy and science can deal significantly with questions about *how* things originate and proceed, by inquiring into empirical antecedents and environment; they never encounter entities beyond space and time which yet somehow work out their purposes *within* space and time. Nor do they encounter a spatio-temporal totality of

    [22] *Op. cit.*, p. 46.

things which necessitates a single cause. In any case, no Thomist has yet shown why we may not simply accept the fact that things react upon and influence one another in a variety of ways and with a variety of effects without making a metaphysical mystery out of it by calling in some being *wholly other* than the complexity, or any element in the complexity, which he is supposed to have originated and to keep in being. If he is *wholly other* than his creation, how could he originate it and maintain it in being? The same kind of question emerges in an examination of the Teleological Proof or Argument from Design, in which the existence of supernatural intelligence is posited to account for the "unconscious co-operation" of non-intelligent material beings in working towards ends.[28] But if events are very different from what might have been expected, there is no logical appeal from the fact that they *are* such, and not other; any explanation of them, any discussion of features and tracing of causal connections, will arise from an examination of the facts themselves, not from something "wholly other" than them. The Thomist destroys the "unconscious co-operation"—or, more accurately, the observable interconnection of things—by attributing it to an unseen divine mind everywhere at work in the world, thus making it God's activity and not that of the things themselves. His appeal to "order" as evidence of God breaks down, since things could not exist at all without "order"—*i.e.*, causal connection: what we call "chaos" in everyday experience is nonetheless "ordered". By attributing "order" or the regularities of events to the operation of a divine mind, the Thomist assumes that "disorder" is in itself more probable than "order"; whereas any other course which things might have taken would have been no less improbable than that which in fact they have taken. And, like all others who speak of natural "harmony", "co-operation" and the like, he tends to be highly selective, finding harmony in interconnections of which he approves and neglecting the irrational "surds", the deep-seated conflicts, the irreconcilable oppositions which are no less prominent in nature. Recalling Mascall's assertion, why should we "give up philosophizing altogether" if, without exception, we find a multitude of causes which all, in turn, demand causes for themselves? All the evidence is of multiplicity and complexity, of change and exchange: in Heraclitus's exalted words, "this world [or world-order] did none of the gods or men make; but it always was and

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[28] *Cf.* Dr. A. C. Ewing's rationalist treatment of "the extraordinary intricacy" of the body's adaptation to serve its own ends (*The Fundamental Questions of Philosophy*, 1951; p. 228 n.).

is and shall be: an ever-living fire, kindling in measures and
going out in measures".[24]   St. Thomas himself insisted that the
temporal beginning of the world is not proved by reason but is
accepted on ecclesiastical authority;[25] and because of this and the
further fact that the more cautious Thomists no longer press the
objections to "infinite regress" which formerly were emphasized,
such questions need not be taken up here.

3. *The Cosmological Proof,* or Argument from Necessary
Being, reasons from contingent being to necessary being, from
that which is capable of non-existence to that which is not.   It is
held that the very existence of contingent beings involves the
existence of necessary being, *i.e.,* being which, from its very
nature, cannot lack existence.   We have to look beyond these
derived, contingent beings for their explanation and, in doing so,
we find ourselves confronted by other things which also require
explanation, since their existence, too, is contingent.   Hence a
complete explanation would take us beyond such things to some-
thing which exists in its own right, and which is outside the
complexity of things which we call "Nature".   Thus a study of
Nature, it is maintained, leads us to the existence of something
on which Nature depends.

This proof may be stated very simply as an argument that
change is an imperfection; things change because they lack that
which can be supplied only by things with more stability, more
being.   The changing, it is asserted, requires and implies the
changeless.

In answering this, we may recall what we said earlier about
the futility of seeking an "explanation" of things in other things,
or in some mysterious power or person above or behind things.
The patient study of the facts, in the light of progressively more
adequate hypotheses, the attempt to describe them fully as they
are and in relation to other things, will supply its own explana-
tion without recourse to "something which is what it is in its own
right"—as though there were anything which does not exist "in
its own right"—*i.e.,* with its own distinctive features, at a par-
ticular place and a particular time.   "Derivation" can refer only
to origin, not to ontological status: an entity may be originated
and physically sustained by others, yet it interacts with those

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    [24] Fragment   30,   Diels;   G.   S.   Kirk,   *Heraclitus*:   *The   Cosmological
Fragments* (1954), pp. 307-324.   On the question of "open" and "closed" or
re-entrant causal chains, see Whittaker, *op. cit.,* pp. 119-130; and for a
criticism of the notion of causal *chains,* see N. R. Hanson, *Mind,* n.s., Vol.
LXIV, No. 255.

    [25] *S.T.,* I, xlvi, 2c; *S.C.G.,* xxxviii.

others on ontologically "equal terms"; its status in being in no way depends upon theirs; and its annihilation is not logically entailed in theirs. Although effects exhibit novel features, they are under the same categories of situations as apply to their causes. Both causes and effects fall within the one logic of events. Because of this, there can be no being outside "Nature"—*i.e.*, outside events in space and time—on which all other beings depend. The distinction between contingent being and necessary being simply does not hold. And the ghost of "potentiality" which haunts this and all the other Thomist proofs can be laid once and for all by attention to the facts themselves. The notion of grades of being, which this proof assumes and which is central in the Fourth Proof, the Henological Argument, is to be rejected as unrealistic for the same reasons which led us to reject the Thomist doctrine of potentiality.

It should be noted that the Third Way of Aquinas uses contingency in a sense which is radically different from that in which we use it in everyday life. We employ it of a relation between things, of the empirical fact that one occurrence is contingent upon some other determinate happening, that there are necessary conditions of occurrence; whereas to the Thomist the world is contingent upon some being outside it and wholly different from it. We have in mind the connection between events in space and time, while the Thomist thinks of the relation between those events (or the totality of events) and a being wholly distinct from them. (Indeed, the strict Thomist would contend that the relationship is onesided: it is proper to speak of the relationship of the creature to God, but not of God's relationship to the creature—a strange haunting, indeed, of personal theism by the ghost of Aristotle's impersonal theism!) The Thomist has in mind the connection between the dependent and that on which it depends not only for origin but also for its ontological status.[26] But this leap from the argument that "X is contingent upon Y" to "therefore X is contingent upon God", is no less breath-taking than the leap of Kierkegaard and his varied brood of existentialists across the void to God, to oneself, or to death. If X is contingent upon Y, then our conclusion that X is contingent upon God contradicts the premise whence we set out.[27]

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[26] This unique meaning of contingency and dependence gives a special colouring to the Thomist doctrine of analogy; but I omit discussion of that doctrine here, since many Thomists contend that it arises only after the fact of self-existent being has been demonstrated.

[27] See Professor P. H. Partridge, "Contingency", this *Journal,* Vol. XVI, No. 1. Box, in criticizing Mill's argument against a First Cause, makes a typically rationalist distinction between the *circumstances* of causation (causality as we experience it) and the *essence* of causation (the ontological dependence of the entity upon the Creator); *op. cit.,* p. 144.

Some orthodox Thomists freely admit that the contingency of the universe can be proved without *ipso facto* proving God's existence—a very significant admission, indeed, in view of the familiar Thomist claim that the very existence of finite, contingent being implies the existence of necessary being. Hume showed that there was nothing self-evidently absurd in the hypothesis which maintains that the universe is contingent without at the same time implying a knowledge of God's existence. And we have already noted St. Thomas's admission that there is nothing in reason against the view that the universe has always existed. On the Thomist view, then, there is nothing irrational in the notion that the universe has always existed without a temporal beginning. Further, if it were self-evidently absurd to maintain that the universe exists contingently without God, then the existence of God would be self-evidently true; and this no Thomist accepts. All these are extremely significant admissions, which certainly do not render any easier their attempt to argue to an uncaused First Cause or a Necessary Being. They cannot, on their own thesis, deny *the logical priority of the finite to the Infinite*; and this compels the admission that the existence of God is not *actually* apprehended, even confusedly, when finite being is apprehended as a *datum* in the theistic proof. They must try to work out the implications of finite being, without actually glimpsing God even through the distorting medium of finite being. As the finite is logically prior to the Infinite, we are warned, in Fr. Horgan's words, that "neither before nor after the proof for God have we a concept of Infinite Being, which is either proper or adequate or even positive in content". No qualities of Infinite Being can be posited: the idea of Infinite Being is negative, not positive, and the mathematical notion of infinity is irrelevant to the discussion. "Even infinite space or infinite time we conceive not as something positively infinite, but only as an *indefinitely* expanding finite. *A fortiori* we have no positive idea of God." If we cannot specify a single quality of the divine being, but have to content ourselves with negatives, how can we talk about God at all, and how can we assert definitely that he is *not* this or that when we have no positive idea of what he *is*? We cannot say what God is *not* unless we have some notion of what he *is*: that is, unless we can specify at least *some* of his qualities. The Thomist admits that we cannot give any account of the Infinite because, until we know that God exists, we cannot attach a real meaning to infinity. It is a Thomist, not an opponent of Thomism, who declares that "The 'infinite background' against which the finite

universe is supposed to be defined is purely imaginary"; and that what is "imagined is not positive infinity, but only the possibility of an *indefinitely* expanding finite".[28] Infinity, then, as used by the Thomist, is not the infinity of spatio-temporal reality, but is "Infinite Being [which] is, in Itself, purely positive perfection, actually existing, the Plenitude of being, which no finite mind can conceive positively and which acquires meaning only relatively to finite being through the proof for the existence of God".[29] Nothing is done to show that these impressive terms have any content; indeed, we are warned that we cannot form any positive notion of them whatsoever. Every avenue to a *positive* conception of God's being is closed; on the admission of even the most orthodox Thomists, the Five Ways are as useless here as any other supposed path to Infinite Being, in giving us any positive account of what lies at the far end. There is not the slightest advance in Thomism on the Brahmin *neti, neti* (not this, not that) answer to any inquirer as to Brahman's properties. All empirical notions of infinity are excluded from the definition of Infinite Being; and we are presented, instead, with something totally different from the infinite space and time of mathematics and physics. Only by forcing the multiplicity of things into a totality, and then positing the need for a cause wholly other than the totality, can we arrive at the veiled Infinite Being of the Thomist's metaphysical dream-time.

Equally unconvincing is the attempt to show that this Infinite Being is logically necessary to contingent being, particularly when the special Thomist use of "contingency" is remembered. Indeed, all attempts to show that belief in God is "logically necessary" have broken down. A thing is logically necessary only in the sense that logic finds it to be the case. Since causality is a universal category of situations, it is logically necessary that an event B should have a cause, but it is *not* logically necessary that the cause of B is A. Both the causes and the properties of things are "given" or observable: there is nothing in the logical description of being and its conditions to necessitate them. There is no single necessitating principle for all occurrences, nor a Leibnitzian plurality of original necessitating factors from which all subsequent occurrences unconditionally follow.[30]

It is interesting to find an eminent Thomist philosopher, Fr. D. J. B. Hawkins, attempting to dismiss as unworthy of careful

[28] Fr. John Horgan, *op. cit.*; his italics.
[29] *Ibid.*; *cf.* Copleston's attempt to affirm divine "attributes" without specifying any positive divine qualities (*Aquinas*, pp. 126-134).
[30] Partridge, *op. cit.*

attention Kant's objections to "necessary being" and then
implicitly conceding them.[31] Discussing the Ontological Argument,
he admits that if we begin with mere concepts we must end with
them; hence "it is impossible to argue from the logical to the
real order". It is strange that Fr. Hawkins fails to see that this
admission is as devastating to the Cosmological Argument as it is
to the Ontological Argument; for in both proofs there is the
notion of a being the nature or essence of which implies its
existence. Kant's basic criticism of the Cosmological Proof is
not weakened by minor defects[32] in his argument: since existence
cannot be inferred from concepts, there can be no necessary
being; and, with the demolition of necessary being, the Five
Ways disappear. On this question of necessary being, Hume's
logical acumen is no less evident than Kant's. His oft-quoted
words are worth quoting again.[33] He directs attention to the
"evident absurdity in pretending to demonstrate a matter of fact,
or to prove it by any arguments *a priori*", and continues:
"nothing is demonstrable, unless the contrary implies a contra-
diction. Nothing, that is distinctly conceivable, implies a contra-
diction. Whatever we conceive as existent, we can also conceive
as non-existent. There is no being, therefore, whose non-existence
implies a contradiction. Consequently, there is no being, whose
existence is demonstrable." To the assertion that God is neces-
sarily existent because, if we knew his whole essence or nature,
we should see that it is just as impossible for him not to exist as
for twice two not to be four, Hume replies that such knowledge
is, obviously, beyond our faculties while they remain the same as
at present. "It will still be possible for us, at any time, to conceive
the non-existence of what we formerly conceived to exist; nor
can the mind ever lie under a necessity of supposing any object
to remain always in being; in the same manner as we lie under a
necessity of always conceiving twice two to be four. The words,
therefore, *necessary being,* have no meaning; or, which is the
same thing, none that is consistent." When Cleanthes, into whose
mouth this argument is put, goes on to ask why the material
universe may not be the necessary being, he himself furnishes the
answer by showing that "the uniting of these parts into a whole,

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[31] *The Essentials of Theism* (1949); p. 68.

[32] See Fr. T. A. Johnston, S.J., this *Journal*, Vol. XXI, No. 1; Alan
Donagan, review of Fr. Hawkins's book, *ibid.*, XXVIII, 2.

[33] *Dialogues*, IX. *Cf.* also *Treatise*, I, ii, 6; I, iii, 7.

. . . is performed merely by an arbitrary act of the mind, and has no influence on the nature of things".[34]

Conclusion.—The notion of dependence is the supreme example of Thomist relativism; for we are invited to seek the qualities of things in their relations, *i.e.*, in their dependence upon God; relations which, if they could be demonstrated, would tell us nothing of the properties of the things themselves. But the Thomists do not even show that there are any relationships between things and God, since the spatio-temporal realm and the "transfinite", transcendental order are absolutely different and distinct from each other. Again and again in discussions of the Five Ways, the question turns up like Hera's stinging fly to plague the luckless Thomist Io: how, on a consistently dualist thesis, can there be contact of any kind between God and the world since there are no terms common to both? The question is all the more troublesome, since no positive qualities of any kind can be distinguished in God himself. No Thomist has ever come within sight of a logical solution of this problem, for the very good reason that none can be found. Yet it is in terms of this utterly transcendent being, of which nothing positively is known, that the world of space and time is to be explained! But it has not been shown that there is only one utterly transcendent being: there might be a multiplicity of Prime Movers, as Aristotle thought possible;[35] or the Prime Mover, First Cause, Necessary Being, etc., might be different deities. And even if the existence of one transcendent deity had been established, it would not by any means necessarily follow that he is the perfectly good being of the Henological Proof.

It will be seen from all this that, although Thomism claims an empirical basis—*nihil in intellectu quod non prius in sensu*—it jettisons experience when it begins to talk about God. It invites us to study the empirical fact of finite beings, but we are not to suppose that by the exercise of natural powers we can directly apprehend God, that he is the terminal object of acts of perception, or that it is only through finite beings that we can perceive him. On the contrary, we are to understand that our acts of perception terminate in the finite beings, not in God; and that it

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[34] Professor G. E. Hughes's proposal (*Mind,* n.s., Vol. LVIII, No. 229) to reformulate the "necessary being" argument as "the proposition 'God exists' is necessary, or 'necessarily true'", far from possessing the "great advantages" which he claims for it, leaves the position exactly as it was before. In both cases we are dealing with propositions, and Hughes's restatement is only another way of saying "necessary being exists". In both cases, it is contended that the assertion is required by the fact.

[35] *Metaphysics,* XII, 8.

is only too easy for us to grasp them in their "bare particularity" and so derive from them no notion of a Creator.[36] It is, of course, simply not true that we ever perceive an entity in its "bare particularity": in one and the same act of perception an entity is grasped not merely as a thing but as a *sort* of thing, as a member of a class and not as an isolated individual; and if we did not observe generality at the outset, we could never reach it by stringing particulars together.[37] The important point here, however, is the Thomist admission that the Five Ways, after all, do not terminate in God, but in the familiar world of space and time. The inquirer, like Chesterton's eager explorer, reaches what he takes to be a hitherto undiscovered country, only to find that he has returned to the place whence he set out! It is because of the supposed ontological and other imperfections of finite beings that the divine being is said to be "necessary" and to contain perfections which no finite being can even dimly apprehend. What has happened, however, is that, having forsaken the Heraclitean logic of the "common", the Thomist has followed his Five Ways into the sterile dualism of a God and a world which "are, in all rigour, incommensurable",[38] and which, therefore, can be brought into contact with each other only in phantasy. His rejection of logic in favour of what may fairly be called a "logic of the singular" makes him, in the end, an unwilling bedfellow with his Augustinian opponent.

Sydney.

[36] Mascall, *op. cit.*, pp. 72-3.

[37] See John Anderson, "Empiricism", this *Journal*, Vol. V, No. 6; "The Problem of Causality", *ibid.*, Vol. XVI, No. 2; T. A. Rose, "The Nominalist Error", *ibid.*, Vol. XXVII, No. 2.

[38] Gilson, *S.M.P.*, p. 96.

SOUND SLEEP AND SOUND SCEPTICISM

By ROBERT BROWN

A controversy which had its origin in an article in *Mind* by Miss Margaret MacDonald[1] but which owed its development to various authors,[2] has now been rejuvenated by Mr. Norman Malcolm.[3] He wishes to conscript one more member for the growing army of pointless laments and his candidate is familiar. It is this: "I cannot tell whether at this moment I am awake or sound asleep and dreaming." It is a mistake, he argues, to claim "either that you can tell or cannot tell (in the sense of *determine*) that you are sound asleep and dreaming, or that you are awake". For, he goes on, if you are in a state of sound sleep you are not, as many philosophers have believed, in a state of consciousness. In order to make the test that will enable you to tell whether you are awake or sound asleep you must be in some state other than that of sound sleep. Nothing depends upon the results of the test, says Malcolm, and, therefore, the "How can I tell?" question to which the test is the presumed answer is, like the test itself, not genuine. There can be no such test as philosophers, Descartes among them, have offered for distinguishing sleeping from waking. "The notion of a person's determining whether he himself is awake or sound asleep is senseless."

I suggest that it is a mistake to say that a person in a state of sound sleep can never (logically) be in any state of consciousness, and that even if we grant this claim we can yet show that the attack on The Sceptic's Question is misleading. I shall take up first the arguments concerning the state of the sound sleeper and shall then consider the assault on the sceptic's lament, an assault which the earlier arguments are intended to support.

I

By drawing a distinction between being half asleep and sound asleep, Malcolm wishes to make clear that a person who is sound asleep is not in any state of consciousness. The sound sleeper cannot have any thoughts, feelings, sensations or emotions

[1] "Sleeping and Waking", April, 1953.

[2] L. E. Thomas, "Waking and Dreaming", *Analysis*, June, 1953. M. J. Baker, "Sleeping and Waking", *Mind*, October, 1954. T. Yost and D. Kalish, "Miss MacDonald on Sleeping and Waking", *Philosophical Quarterly*, April, 1955. W. Von Leyden, "Sleeping and Waking", *Mind*, April, 1956.

[3] "Dreaming and Scepticism", *Philosophical Review*, January, 1956.

in the sense in which a person not sound asleep can have them. If this is so, then "the content of a dream and a waking episode" cannot be the same. Two sets of criteria for each state of sleep are given by Malcolm as those commonly used, one set for determining whether a person *is* now asleep and another set for deciding whether someone *was* asleep.

Suppose now that someone has a nightmare; he thrashes about in bed, screams, and eventually awakes with a pervading sense of anxiety that remains with him all day. He describes this as being a *continuation* of the anxiety he felt in his nightmare. This, according to Malcolm, is a mistake. How shall we correct him? Shall we say, for example, something like the following: "In your nightmare you simply *dreamt* that you felt anxious. It does not matter that when you awoke your heart was pounding, your pulse rapid, you skin moist, and that you felt anxious for some hours afterwards. Your present anxiety is not a continuation of your dream anxiety." Or shall we say, instead, "You were not sound asleep, for while satisfying all the other criteria of sound sleep, you did not satisfy these: that your body be inert and your breathing rhythmical. You can certainly dream in a sound sleep, but if you stir about and cry aloud, then you are merely half asleep."[4]

If we make the first answer, we may do so because we believe, as Malcolm apparently does, that a dreamt fear of snakes does not imply that the dreamer was actually afraid of snakes. Now it is surely correct to say that a dreamt fear of snakes does not imply, in any sense of the word "imply", an actual fear of snakes. A person may dream that he is being strangled by a python, may knot the bed-clothes and call for help. When he awakens, he may be trembling and for some time show clear signs of being afraid of snakes, especially of large ones. It may then be said that a person does not display such behaviour unless he is afraid of snakes, consciously or unconsciously, before his dream; and this may be taken to indicate that the dreamt fear of snakes *does* imply an actual fear of snakes before the dream rather than after it. This is incorrect, however. The dream fear does not imply that the dreamer is actually afraid of snakes either before or after his dream. The dream fear may, for example, have a correct Freudian interpretation. If so, it may indicate that the dreamer is afraid before his dream or after it, but not of snakes. He is afraid of something else. Naturally the statement that Pamela dreamt that she was afraid of snakes does

[4] Op. cit.: p. 17 lists the criteria.

not *entail* the statement that she was actually afraid of snakes. But they are not incompatible. Yet to say that a dreamt fear of a particular thing does not imply an actual fear of that thing (or kind of thing) is quite different from saying that a dreamt fear is never a genuine fear. A dreamer may have genuine emotions although they may not be about what the dreamer takes them to be about. Thus in a nightmare the physiological symptoms of intense emotion may be present and these may continue to be present after the person is awake. As a matter of fact, the person often has to be comforted *after* he has awakened. He has to be reassured that there is nothing to fear, and this is especially difficult in those cases where the dream is a symptom of neurotic anxiety. After all, there *is* something that the person fears, awake or asleep, even though he does not consciously know what it is. Again, it is a commonplace of parental lore that young children have to learn to distinguish dream fears from waking fears. If the view being attacked is correct, we shall have to argue that children, but not adults, can have emotions while sound asleep. Then there are the dreams that fill the dreamer with what long before Freud were called "nameless terrors", a kind that may persist long after the dream has ended. The sleeper enmeshed in a nightmare of this sort may express by his movements and speech the kind of behaviour that, if expressed while he was awake, would be called "fear". In such a case, what is the crucial difference between the nameless terror of the nightmare and that of the waking hours?

The sound sleeper is no better placed to think than he is to have emotions, says Malcolm. To go to sleep with a problem and to awake from a sound sleep with a solution is not to say that the sleeper has thought of a solution in the sense in which he can think of a solution in his waking hours. He has simply awakened with a solution; no thought has *occurred* to him. But tempting as it is to hold this view, it does turn the whole affair into magic. I can go to my office in the morning with a problem and return home in the evening with an answer. And I can awake from a sound sleep and truthfully utter the words "I have thought of an answer". If the one case is an example of thinking, then surely so is the other.

There are *two* kinds of sound sleep. These are related to the two ways in which a person can be unconscious. He may be unconscious in the sense of simply being dead to the outside world. He may also be unconscious in the sense of having no mental life, no thoughts or emotions. A person may be uncon-

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scious in the first sense without being unconscious in the second. He can also be physically active while in a dreamless sleep; though he cannot, of course, respond to questions or commands and yet remain unconscious in the sense of having no mental life. The two kinds of sound sleep corresponding to these are (1) the sleep in which the person remains unconscious to external stimuli, but has genuine thoughts and emotions in dreams and (2) the sleep in which the person, whatever his physical state, has no dreams, thoughts or emotions. It is only this second type of sound sleep that Malcolm recognizes. In it there is certainly no continuation of thought and emotion into the waking state. It is logically impossible for the sleeper in this state to doubt, fear or test anything. However, there is the other sort of sound sleep and it is this which my examples illustrate. In such sleep a person can have emotions, can think, and in at least one sense of the word "test" to be discussed presently, can perform tests. Hence, it is not enough to distinguish half-sleep from sound sleep in order to claim that a sound sleeper is not in any state of consciousness. Two kinds of sound sleep must be distinguished, and this requires distinguishing the criteria for each kind. Obviously, if, as Malcolm does, we take unresponsiveness to external stimuli for our chief criterion in determining whether a person is sound asleep *now*, then we often cannot separate the two sorts of sleep. We must wait until the person awakes and we can question him.

We may choose the second prong of the fork. We may, that is, want to claim that a person who has a nightmare is not in a state of sound sleep at all. He may, of course, be able to satisfy some of the criteria for being in a sound sleep: once awake he can indicate that he had no knowledge of what went on near him while he slept; while still asleep he can fail to respond to various stimuli applied to his body or to speech directed toward him. However, his body is not quiet and this is what makes him fail the test for being sound asleep. Malcolm points out that this part of the test is less important than the other parts. People vary widely in the number of times they change position while asleep, and when we consider that the restlessness of sleepers is common knowledge, we may reasonably be suspicious of the weight of this criterion in common use. If the sleeper says, "I slept like a top last night" and his bed-mate replies, "You certainly did; you spun constantly", we may not be inclined in the face of the first speaker's cheerfulness to disagree with him. But he need not have the last word on the subject. For the expression "sound sleep" may be used by someone when he awakes feeling fit no matter whether he slept deeply or not. On the other hand, it can

happen that a person may in his sleep be "dead to the world" and awaken in a state of exhaustion. He may then say, "I did not sleep at all soundly" and be told that he did sleep deeply, nevertheless. As far as he is concerned, the quietness of his body during sleep may have little importance as a criterion of either the peacefulness or the depth of his sleep. As far as his observer is concerned, the body movements are of interest only when combined with other evidence. They are an unreliable indicator of depth of sleep and this is discovered by the use of the other criteria, including the report of the sleeper. He may report: "I lay like a dead person all night trying to get to sleep and remained completely awake."

If it is true that a person can have a nightmare and still be in deep sleep (or solve a puzzle in such sleep), then a person who is sound asleep may sometimes have thoughts and emotions. "The *content* of a dream and a waking episode" may be the same. However, it does not follow that a sound sleeper can perform tests and make decisions in all senses of these words or have correctly applied to him any member of a large range of mental epithets. In order to show that a sound sleeper could or could not be correctly characterized in these various ways, we should have to discuss the various classes of expressions in turn. I have suggested that the expression "sound asleep" is applicable both to sleepers who are not in *any* state of consciousness and to those who are in some state or other. Malcolm's arguments are valuable here because they show us that there are some expressions we cannot sensibly apply to the sound sleeper. But do they show that no mental epithet is relevant? In one sense it does not matter whether the discussion of the sleeper's thoughts and emotions is adequate. It does not matter because even if we accept these subsidiary arguments put forward by Malcolm, they still do not blunt the point of the question "How can I tell whether I am now awake or sound asleep?"

II

Let us agree that the sound sleeper is completely unconscious to the outside world. He can make no tests for discovering whether he is asleep or awake. It is absurd to say, then, either that he can tell or cannot tell. The question, says Malcolm, can arise only when he is at least partly awake. Is all of this true? Clearly, the sleeper can *dream* that he is awake and asking the "How can I tell?" question, and he can dream that his "tests" do or do not give results of some kind. The dreamer cannot really answer his dream question because, by Malcolm's argument, he

will have to be awake in order to attempt it; once awake, he can be shown that it is an absurd question. He dreams that he is awake—or asleep—and he actually can apply no test to find out. In his dream he may say either "I can tell" or "I cannot tell". When he awakes and remembers his dream, he can say: "There are times when I dream that I ask the question and make the tests, but still am not satisfied. For I keep asking myself whether or not I am dreaming. No matter how many tests I dream that I make, I can still remember in my dream that on past occasions I woke up. The dream question is unanswerable." Thus it does no good to claim, as Malcolm does, that the dreamer cannot actually raise the question. He can dream that he raises it—and answers it. While still in the dream, he cannot (logically) distinguish his dreamt question from his waking question. It offers the dreamer no help for him to recall in his dream that if he is awake he can really tell that he is and that if he is asleep he cannot tell (logically) that he is sleeping. Nor can it help him to recall that Malcolm says both the question and the test are absurd.

Consider: during the hours when I am awake I can tell by various means that I am awake but not that I am asleep. When I am asleep I can dream that by various means I can tell either that I am asleep or that I am awake. The "day-time test" cannot be a genuine one, says Malcolm, because it can have only one conclusion: that I am awake. The "night-time test" can have no conclusion, for it is not a test at all. So both are "pseudotests", though for different reasons: the first because it does not distinguish between genuine alternatives, the second because it is only a dream test. Why, then, does anyone ever ask the "How can I tell?" question? It is the result, is it not, of his having at some time vividly dreamt that he was awake or of his having in some waking hour believed that he was in the midst of a vivid dream? How did he assure himself that he was not dreaming? By saying to himself "My doubt is a senseless doubt"? Not likely; his reassurance came from noticing such things as the systematic way in which one event was related to another. But suppose they were not systematically related, that a large scale practical joke was being perpetrated. The victim could (and has in the past) come to think that he was dreaming. And in the situation he would not be able to tell whether or not his conclusion was "self-contradictory" (in the sense of falsifying the presuppositions of its utterance). In such a case the test would be genuine. For to the extent of the victim's knowledge there were two alternatives: either he was awake or he was not. He could only find out afterwards that he was awake all the time and

thus had no real choice before him. The difficulty here is that in the statement "I can tell (know that) I am awake but not that I am asleep" the phrase "know that" is one of achievement. I can know only what is the case. I (logically) cannot know when awake that I am asleep and dreaming. But to someone who wishes to know which state he is in the problem remains. Hence, the day-time test is legitimate and not always conclusive. The night-time test is illegitimate but can be temporarily indistinguishable from the legitimate test.

So far I have followed Malcolm in not raising the question whether there are different senses of the word "test".[5] But it is clear that there is: (a) the intervention by an agent so as to make something happen, (b) the rearrangement of available information, i.e. noticing by this means what had not been observed previously, and (c) the alteration of the environment by itself. All three of these can occur in waking life, even in hallucinations. In sound sleep of the kind to which I have been drawing attention tests (a) and (c) cannot take place, whereas tests of type (b) can certainly be made. They are made when in dreams we notice such things as lack of causal relationships, miraculous happenings and other magical features. In this kind of sound sleep, as opposed to the completely unconscious kind, we can actually make such tests and decide that we are or are not dreaming.

"How can I know whether I am now awake or sound asleep?" can be interpreted either as "How can I ever tell?" or "How can I always tell?" The answer to the first question is: by all the familiar means that are summarized under the title "principle of coherence or consistency". The answer to the second question is that we cannot *always* tell. Occasionally, as in dreams or rare waking moments, our tests do not allow us to tell, either because we are not in a situation in which they can be legitimately applied or because they are not decisive. We simply have to await the lapse of time in both cases. Of course, we cannot (logically) know at the time that these are the situations in which we find ourselves. And this is why our lament is simultaneously genuine and incurable.

Australian National University.

DISCUSSION

THE FEELING-STRIVING PROCESS

By L. E. Palmieri

Apart from his introduction, his comments on language and his brief sketches of different ethical theories, there are two main contentions which Garnett wishes to make in his *The Moral Nature of Man*. These two main contentions form the framework of the book. They are (1) that other naturalistic ethical theories are inadequate, and (2) that he (Garnett) has a theory which is at once adequate, naturalistic and free from those difficulties which dog other naturalists when writing on ethics.

In this paper I shall be brief to the vanishing point, allowing Garnett to speak for himself. I shall allow, at least for this paper, that his objections to the views of other naturalists are sound ones. I shall then point out that language plays him false, so that his view is clearly not adequate and that while he might be said to stay clear of the difficulty which he claims other naturalists have unsuccessfully faced, he does it the way Mrs. O'Brien kept her hair dry while swimming: by not going into the water at all.

The difficulty with other naturalists is that, if one begins with a biological view of human nature, the actions of an individual are mere reactions to the things about him so as to maintain equilibrium and, perhaps, to ensure continuous growth. Beginning this way, Garnett claims, one cannot explain obligation and why we should be concerned with the welfare of others. Garnett objects to all the attempts of Hook, Hume, Dewey, Mead and others to give a satisfactory account of this consistent with their naturalistic views. In short, Garnett means to make the following claim: Suppose I have a choice of either doing something which will be of benefit to me alone, though neutral or harmful to others, *or* doing what will benefit others, though neutral or harmful to myself, and I take the first of these, asking "Why should I be concerned with the welfare of others?". Though other naturalists can give no reply which is both persuasive and consistent with their ethical theories, he (Garnett) can.

Garnett's attempt to overcome the difficulty and to give a satisfactory reply to the question raised in the situation above is

found in what he says about the feeling-striving process. He says that empirical considerations *suggest* that the process is active and directed to objects about us. Then, "This is indicated by the following facts: (1) Animal life is essentially active, going out to impinge itself upon its environment, not merely reacting to effects of the environment upon it so as to restore equilibrium. (2) Feeling-striving is directed primarily upon external objects, not upon an inner state of pleasure. Pleasure or satisfaction is felt when the objects are controlled and adjusted in ways we want them to be. It is the wanting the objects to be thus and so that is primary. (3) We are not content with sameness of objects, however comfortable we are internally, but experience an urge to manipulate and change them. (4) The change which, on the whole, we strive to create in objects is the sort that makes it possible to control and readjust objects more and more effectively. Thus that state of objects is regarded as good which is seen as serving the expansive movement of life. (5) Although the young child at first necessarily judges objects as good only as they are seen as gratifying the expansive movement of his own life, yet it is evident that, as soon as he becomes clearly aware of the existence of other centres of such life and gratification, he judges objects as good if seen as gratifying the life activity of those others; he then manifests spontaneous interest in these goods, though such interest is not at first strong enough to counteract established interests in the goods that are seen as more immediately gratifying.

"These facts indicate that the feeling-striving process is not merely a reaction tending to restore the equilibrium of the organism. It is an expansive and creative activity, driving the organism to impinge itself upon its environment. *It* (the feeling-striving process) *reacts selectively to the environment in ways which are found to increase the malleability of the environment to life activity* (italics mine) . . . . Because the primary nature of its drive is upon the world of objects (not reactively upon itself), and its selective choice is primarily directed to increasing the malleability of objects (not to increasing its own power over objects), its primary aim, as it discovers its world to be a world containing many such lives as its own, becomes that of increasing the malleability of its world to such life as its own. Thus life below the human level is incapable of being self-regarding (because incapable of an idea of the self) and at the human level it is not primarily self-regarding. The feeling-striving is still directed upon the objective world, and its selective preference is for forms of that world that seem to it to be malleable to life

activity—to life activity such as it intimately knows in itself, but not only to its own life activity.

"Thus the feeling-striving processes that enter into the structure of the human mind are primarily and basically disinterested."

At this point Garnett introduces the subject of specific drives, explaining how immediate satisfactions early in life tend to oppose disinterested action, "yet the primary or basic tendency of the feeling-striving process as a whole is a disinterested striving to produce what seems to the individual objectively good. The striving processes of the individual can only constitute an integrated whole so far as they are directed objectively toward what appears to be the greatest possible good".[1]

The diffuseness of the above makes it difficult to examine. One is inclined to believe, after a first reading of the passages above, that Garnett merely wishes to state that a necessary part of our natures is a concern for the welfare of others. But surely we are not to believe that Garnett's ground for this is intuition, for he has charged some naturalists with holding a metaphysical dogma which has no basis in fact. He writes as though *he* intends to give an empirical explanation of obligation and he writes as though he has empirical evidence for claiming that the feeling-striving process is active rather than reactive, that it is directed upon objects beyond itself and that it is not merely concerned with equilibrium. I shall suppose that the five points he lists, though not conclusive, give support to some of his claims about the feeling-striving process. The difficulty is to go *beyond* and establish, by good or conclusive arguments, that "the *primary tendency* (italics mine) of the feeling-striving process as a whole is a disinterested striving to produce what seems to the individual objectively good" and that the processes "can only constitute an integrated whole as far as they are directed objectively toward what appears to be the greatest possible good". I cannot even see that he establishes that the feeling-striving process is *primarily* disinterested, and certainly this much would seem important for him if he is to make a substantial reply to the sceptic. Garnett appears to believe that he has established it in the portion of the chapter which we have quoted. After offering what (he seems to believe) his five allegedly empirical points establish, he tells us that the *primary* aim of the process is to increase the malleability of its world to such life as its own. But the truth is that he gives us no good reason for such

a claim. Unless he can show that there is some clear evidence for this claim, his case falls to the ground. From your observation that I sometimes act to enlarge life for myself, to use Garnett's terminology, and that I sometimes act in a way which, *as a matter of fact,* enlarges life for you and, perhaps, that I even become interested in increasing the malleability of the world for you and your friends, it does not follow, nor would it be suggested to most people, that my primary purpose or at least that of my feeling-striving process is to increase the malleability of my world for such life as my own. The inference is such a wide one that one wonders why such an attempt at argumentation was made. I believe there is an explanation for Garnett's belief that he has made his case, and to this I should like to turn.

I wish to bring up a curious turn of thought whereby the feeling-striving process alternates between multiplicity and unity, if I may be allowed this expression. Garnett asserts that certain features are observed in the study of individuals. Presumably, one uses several persons simply because processes are so complex in character that it is difficult if not impossible to observe all their aspects in one individual. If the analogy is not too crude, we observe the structure and behaviour of that almost unique organ, the human heart. We claim we are studying *the* human heart even though we make observations on first one heart, then another. It seems that in much the same way Garnett comes to say there is *a* feeling-striving process, at least and at most one per individual. Detailed observations made by him are summed up in his five points in the quotation above. In Garnett's view these points constitute evidence for saying that the feeling-striving process moves to the enlargement of life. But though one individual might be observed to behave in such a way as to enlarge life—I only use this expression because Garnett uses it—both for himself and for others, and though another individual is observed to behave in the same way and so on for each person observed, this would not allow Garnett to make his case unless there is The Feeling-Striving Process. From a mere empirical statement that the process in me tends to enlarge life for others, we do not have a sufficient basis for laying down conditions for the personal integrity of every individual. Yet it is precisely in this way that Garnett, beginning by talking of the feeling-striving process *in* or *of* me, ends, by a turn of phrase found again and again in *The Moral Nature of Man,* by writing as though there is The Feeling-Striving Process. Garnett writes as if to assert that the individual keeps or measures his integrity by conforming or behaving so as to conform with The Feeling-Striving Process, of which his feeling-striving process is an

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integral part. All this reminds me of a story. A boy whose hobby is raising rabbits asks his philosopher father what he is writing about. The father, despairing of stating his thoughts, instructs the boy to bring all his rabbits into the room. The boy follows instructions, though with some misgivings. "Now", says the father in a patronizing tone, "each of these is a rabbit, and if we had all the rabbits there are the collection would be The Rabbit, and if one rabbit behaved in an unusual way he would be violating the nature of The Rabbit. Only by behaving in conformity with The Rabbit does this individual rabbit here keep the integrity of himself, i.e., The Rabbit". The boy walks away puzzled and I, with nearly every critic of Plato, would be puzzled too.

It should be clear that the view of the feeling-striving process as an ideal or peg concept will not do for Garnett, since he would then have to make a case for our special relations to this ideal and give reasons for our conforming to this ideal. That is to say, if the ideal were a mere idea gleaned from a study of individuals, Garnett would still have the question of why we should conform with this ideal. He would still be faced with the sceptic's question: Why should I be concerned with the welfare of others? A physiologist speaks of the human heart. He has learned about the heart by a study of many hearts but he does not wish to assert that there is a human heart which is not someone's heart. When he says he has knowledge about the human heart he is talking about an ideal used for purposes of further judgment and he understands that he has a peg on which to hang his knowledge. Of a given heart he might say it is defective or normal, as the case may be, but he does not for one moment believe that moral obligation is involved in any way.

The *seeming* strength of Garnett's view stems from a shifting to and fro between the feeling-striving processes each belonging, in some sense of 'belonging', to a different individual, and the ubiquitous Feeling-Striving Process. In this way, though he would seem to base his case on the feeling-striving process or our knowledge about it, for which there is empirical evidence, he *uses* The Feeling-Striving Process, for which there is no empirical evidence. At least Garnett has not given us such evidence.

In brief summary: if Garnett merely *states* that it is our nature to be concerned with the welfare of others, then his reply is not satisfactory. Not only would it not be satisfactory for Hume, Dewey, Hook and the others Garnett singles out, but it would not be satisfactory for *any* careful empiricist. If

Garnett supposes he has made a case for his important claim, then we must point out that he has not made a satisfactory case, at least not one that will satisfy even those philosophers who would be inclined to agree with Garnett that Hook, Hume and the others mentioned have not adequately treated the matter of obligation. Last, it seems clear to me that language is the source of a confusion and, if we examine that confusion, we find either that Garnett has given us something which if not unintelligible at least needs explanation, or that his feeling-striving process is an ideal. In which case, *by his own demands on the theories of other naturalists* he still faces the question of why we should be concerned with the welfare of others.

Wisconsin University.

CRITICAL NOTICE

Classically, the term "Encyclopedia" has at least two distinct meanings. The older and more general sense is that of instruction in the whole realm of the arts and sciences. More restricted, it means a system of classification of the various branches of knowledge. In this sense, Bacon's *Novum Organum* has often been called an encyclopedia. Lastly, there are philosophical works, such as Hegel's *Encyclopedia,* which attempt a discussion of the various fields of knowledge from a certain special point of view.

The aim of encyclopedias being that of furthering the spread of knowledge, editors after A.D. 1700 soon came to identify themselves with those forces that led the opposition to obscurantism and traditionalism. A typical case is that of the famous French *Encyclopédie.* Whilst an encyclopedia largely in the first of the above senses, the French Encyclopedists thought of themselves as innovators, or reformers, in opposition to the existing systems of thought, politics and religion. The *Encyclopédie* was—as has been so aptly remarked—a "war machine".

Unfortunately, the increasing pace of accumulation of knowledge tends to counteract such aims. The technical level of information in such works as the *Encyclopedia Britannica* is usually too advanced for all but the expert, at the same time offering to the latter "too little, too late". Moreover the whole process of distilling ever more anaemic accounts from the rich undergrowth of active research work tends to give the impression of the body of contemporary knowledge being something complete and finished—thus leading us back to the very traditionalism which the encyclopedia had meant to oppose.

In the last few years new kinds of encyclopedias have appeared, e.g. *Rowohlt's German Encyclopedia* which attempts a systematic survey of contemporary knowledge by means of monographs intended for both layman and specialist. (Compare also the English *Pelican* series.) Here all thought of a "general survey" is abandoned. Rather each contributor develops his subject from within. He starts with a concrete problem, the special case, gradually developing it to embrace more general questions. Above all, he always attempts to keep before the reader the genuine "source materials" which have been used and which originally led to the development of the subject.

The work here under review to some extent shares the aims, advantages and disadvantages of its predecessors. Though not

a review of all "knowledge" it is intended as a survey of the whole of science. Further, it aims at being an encyclopedia in the second of the above senses; its stated aim is methodological in character, to "organise a logical synthesis of science" (p. 8), to "show modern attempts to reform generalization, classification, testing, and other scientific activities, and to develop them by means of modern logic" (p. 10). In method of treatment, most of the contributions come to lie somewhere between the approaches of the old and the new type of encyclopedia. Most of them attempt surveys of the field treated rather than devoting time to individual and living questions within each field. On the other hand, by concentrating on logical questions the lifeless character of encyclopedic contributions is avoided.

An introductory section (1) maps out the field, with contributions by Neurath, Niels Bohr, Dewey, Russell, Carnap and Morris, with Neurath calling the tune. Dewey thought that one of the objects of the Encyclopedia should be to improve scientific education, treating scientific subjects rather less as mere bodies of subject matter and more as a method of universal attack and approach (p. 36).

This is followed by (2) C. W. Morris's "Foundations of the Theory of Signs", fostering the hope that the "prism of semiotical analysis" (p. 126) will help science to avoid "many pseudo-problems which arise from the confusion of statements in the language of semiotic and the thing-language" (p. 135), and by (3) R. Carnap, "Foundations of Logic and Mathematics"; (4) L. Bloomfield, "Linguistic Aspects of Science"; (5) V. F. Lenzen, "Procedures of Empirical Science". Part II gets down rather more to business, with (6) E. Nagel, "Principles of the Theory of Probability"; (7) P. Frank, "Foundations of Physics"; (8) E. Finlay-Freundlich, "Cosmology". This is more technical (mathematical) than the rest of the series, thus rather disturbing the "unity" of the Encyclopedia. (9) F. Mainx, "Foundations of Biology", perhaps manages best to come up to the standards set by Neurath; (10) E. Brunswik, "The Conceptual Framework of Psychology", concludes the series.

Most of these have been published during the last 20 years or so. I shall therefore limit myself to a mention of things which are most likely to strike a reader who now sees the series for the first time as a connected whole. Neurath's programme, inevitably visionary in character, may then be measured against subsequent performance.

Behind the title of the work there clearly lies the view that there is such a thing as "Science" with a capital S, that "the

various scientific activities such as observation, experimentation, and reasoning can be synthesised . . . to evolve unified science" (p. 2). Of course, there must be a less trivial sense in which science is one. It is (as Mill's work already implied) that various sciences such as astronomy, biology, psychology, etc., "are sciences of the same type" (p. 9). To show this, we have to transcend Mill, and apply "logical analysis consistently to the various sciences". It must be said at once that an attentive reader will find it very difficult to discover just what sort of "logical analysis" (of a unique kind) is being applied to the various fields covered in this volume which would give us an explanation of the general thesis.   Indeed, the heterogeneous collection of encyclopedic antecedents mentioned by Neurath rather increases the suspicion that the thesis of unified science is a propagandist slogan, a "war machine", rather than the statement of a fact. At times, the sort of analysis intended seems to be that of such writers as Whewell and Mach, leading to the idea of a "history of the history of science" (p. 13), involving (to cite one instance) comparison of the treatment of Linnaeus' system of classification by Whewell with Woodger's formalisation of biology. The slogan of "unified science" becomes more comprehensible if we remember that it is interwoven with the movement of "logical empiricism or empirical rationalism" (p. 15), spread by the Vienna Circle, a considerable number of whose members are contributors to this work.   The doctrines of this group, e.g. that there is no special sort of "philosophical statement" (as contrasted with scientific) (p. 17) and the implied formalisation of this view in the already some-what dated "semiotic" movement of the 30's and 40's (cf. the chapter by C. W. Morris) are too well known to readers of this journal to need further discussion. Using the tools provided by semiotics, the work of building "systematical bridges from science to science" (p. 18) will be achieved by an analysis of the concepts which are used in the different sciences, including such things as classification and order. Neurath is hopeful about the prospects of combining several sciences by means of "axiomatisation", though he adds "we cannot anticipate a 'final axiomatisation'" (p. 19).

What is important and useful here is the idea that if there is anything common to emerge from the conspectus of the sciences it will not be a "super science", and certainly not "a speculative juxtaposition of an autonomous philosophy" legislating for the various sciences, but rather a certain number of common methodological approaches or points of view. Are there such approaches? Neurath thinks there are; indeed, he thinks they

should be "regarded as the model of man's knowledge" (p. 20). But, as I said, it is difficult to find them anywhere in this volume. To be sure, the contributors are united in upholding "scientific empiricism". They are equally united in their opposition to a "realism of concepts or ideas" (pp. 122, 583, 600, 612, 616, 627, 640), and more generally, to what they call "metaphysics" or "ontology" (p. 482). But what of the performance? This hostility to "metaphysics" leads some of the contributors into some pretty wild statements. Thus P. Frank tells us that the distinction between a description and a causal theory is "purely metaphysical" (p. 436). The law of inertia is "obviously empirical" since it cannot be derived from any self-evident principle (p. 439). Again, we are told that "to say that forces 'exist' (in a stretched piece of rubber) would be as correct as to say that in the number zero the number five 'exists' because five minus five is equal to zero" (p. 444). As a piece of metaphysical provocation this is not bad—but is it more than that? We are told that to treat the wave-particles of quantum mechanics as "objects" is metaphysical. "Confusion is produced by speaking of an object instead of the way in which some words are used" (p. 481). Frank, in a valuable analysis of the language of quantum physics, derives this conclusion from an application of the doctrine of operationalism. But that there are lacunae (metaphysical lacunae!) in this becomes obvious when on the next page we read "the statement 'the will is free' has certainly no operational meaning. It is a purely metaphysical statement and cannot be supported by any physical theory". Statements such as these and more guarded ones such as Morris's "the meaning of a sign is exhaustively specified by the ascertainment of its rules of usage" (p. 125), though we still remember the revolutionary excitement on making first contact with them, have not worn as well as we might have thought 15 years ago. To be sure, we cannot return to the philosophical age against which they constituted a much-needed protest. But often (so we now see) the metaphysical bogey reared its head when least expected.

It seems that in biology especially lurks the enemy: "realism of ideas". Certain linguistic expressions mislead us, as when we say that in the development of an organism a structural plan is realised, or that the development "deviates from the structural plan" or "follows one" or is "governed by one". Actually they have only a "metaphysical sense", exist "only as an idea in our consciousness" (p. 583). Likewise, "in nature there are no species . . . only individuals of various ages" (p. 608). But aren't there? Are we really ever seriously misled into expecting

to meet a species in the way we meet individuals? As Mainx admits, "scientifically educated" persons aren't! (p. 608). What then is the trouble? After telling us that in nature there are no such things as species, he goes on to say quite naturally that a population is a system "in which definite relations prevail between the individuals"—indeed, he speaks here of an "inner system property". Now I don't know, but I think that the battles fought for or against the "reality of species" could now be fought in terms of "for or against inner system properties". And when the same author tells us that the distinction between "order-analytical" and "causal-analytical" laws (roughly: descriptive generalisations vs. laws of nature) is fundamental (p. 581) we are reminded that Frank has previously denied any value to this distinction (p. 436). We realise then that there is a considerable lack of unity and direction beneath the seemingly tightly-knit fabric of the Encyclopedia. Moreover most of the writers occasionally waver in their estimation of the place of "speculation" and "metaphysics" in relation to the development of science. Mainx again, after telling us that such concepts as "type", "species", "form", "life" not only commit the mortal sin of conceptual realism, but being imprecise and lacking "unambiguous rules of operation" (p. 621) must "always remain sterile speculations" (p. 627), simultaneously slips in a totally different evaluation of these concepts. For on p. 625 he tells us that "the function of speculative theories of a general kind obviously consists only (sic!) in forming a conceptual background offering incentives of a general kind, revealing possibilities of thought, and in this way enlivening the investigation". Such vague theories and concepts, then, fulfil a valuable role. True, their importance decreases with progressive increase in knowledge. The history of science presents the continuous spectacle of periods of speculative advances being subsequently matched by empirical correlation, and vice versa. Similarly, Brunswik draws attention to the fact that there is a correlation between many scientific problems in their mature stages and the older philosophical controversies. Whilst most of the contributors harp on the requirement of specificity of definition, Neurath finds that "an empiricist must permit himself, if necessary, a certain vagueness. Sciencism . . . does not depend upon 'exactness' but only upon the permanence of scientific criticism. New ideas of scientific importance start mostly with vague and sometimes queer explanations; they become clearer and clearer, but the theories which follow will stand in time before the door with all their new vagueness and queerness" (p. 21). And, of course, the two ideas

are not exclusive; witness V. Lenzen's superb account of the method of "successive approximation" and "successive definition" (pp. 321-6).

In sum, if you hope to extract a clear philosophical line, something seriously supporting the revolutionary fervour, you may be disappointed. However, what about the contributions as such? Leaving aside now the claims of "unified science" and "rational empiricism", do they help us to learn something about the methods and conclusions of the different fields they cover? As might be expected, each contributor has in fact used his own methods of approach. I cannot help it if I find a painstaking analysis such as Carnap's "Foundations of Logic and Mathematics" unrewarding. When I have worked my way through the language constructions and the logical calculuses giving a formal representation of some fairly obvious distinctions between physical and mathematical calculi, I find the exciting problems of the philosophy of science polished off by means of a few asides which are not made any more persuasive for having little obvious relation to the previous formal constructions, whilst the latter have only had the effect of giving one the impression that both science and its method can be fruitfully stuck into a procrustean mould. Thus, on p. 209, the possibility of formalisation is identified with the progress of science and in turn is allowed to decide the tricky problem of "intuitive understanding" of the abstract terms and axioms of the system. The question whether a model is or is not "essential for a successful application of a physical theory" (p. 210), can—as N. R. Campbell has indicated—hardly be solved by showing that the theory can be formalised and that its "elementary terms" have an interpretation. Three of the contributions cover aspects of physics, and at times develop into an "Enc. Brit." type of survey. Frank's article is useful in its attempt to treat the various classical and modern branches of physics from a unitary, i.e. operationalistic, point of view. This has the refreshing effect of introducing things like "entropy" without the usual paraphernalia of "Carnot cycles" and "heat engines". On the other hand, Frank himself is quite happy to talk about "perfect gases", "infinitely slow expansions", though the *operations* involved (and their relevance to the operationalist thesis) aren't discussed any further. Similarly, when we come to his statement of the theory of Relativity, we become involved in the concept of "inertial system" (p. 453). We are referred back to pp. 438-9, only to find that this concept can become operationally meaningful only by the introduction of another reference system, the system of the fixed stars being

"only approximately" such a system, and likewise the law of inertia "cannot be exactly true", if given an operational meaning . . . Nevertheless it is in the realms of relativity and quantum physics that the operational point of view proves so fruitful by giving us a unitary approach. But I think one ought to realise that this point of view *is* an *interpretation* and not a strict deduction from those physical theories. The statements of, say, the special theory of Relativity do not need reference to this concept at all. Indeed, since the results of that theory follow from the principle of relativity together with the postulate of the constancy of the velocity of light, the point about the indefinability of absolute simultaneity is not an essential ingredient, but is an interpretation of the Lorentz transformation equations, themselves derivable by the use of the above principles.

Of the remaining essays, the one on Biology is perhaps the most useful one to the general reader, and even (let us hope!) to the specialist, since synoptic views of that science by other than special pleaders are relatively rare. Mainx treats the work of biologists from the morphological, the physiological and the genetical points of view. This is followed by a discussion of some of the more complex questions of the organism as an open system of growth, development and reproduction, of the concept of "population", etc. The author shows that many of the statements of biology are what he calls "blanket-statements" (pp. 585, 597), i.e. statements that are really complexes of other statements which alone are experimentally testable. The relation between these two types are not as rigidly formal as, say, those between the axioms and the theorems of a physical theory, though there are obvious affinities. As mentioned, Mainx characterises speculative theories by the "imprecise definitions of the concepts used" (p. 621). When he speaks as a biologist, and not as a logician with a message, he contradicts this statement, for instance in the remark (p. 591) that "the concept of the gene is by no means dogmatically frozen"; it is "defined by many points of determination". Indeed, it is in this field that the true status and function of scientific concepts emerges very clearly. Thus originally the hypothetical concept "factor" is merely introduced in order to correlate certain observable breeding results. "If the statement were restricted to this correlation, i.e. had no other content than this rule of operation, then it would be a tautology and therefore not testable by experience. But, owing to the fact that the concept 'factor' is invested with still other defining characters which are empirically testable, such as its behaviour during gamete formation and fertilization, the whole hypothesis becomes scien-

tifically useful" (pp. 590-1). This essay contains a wealth of discussions of this kind, too numerous to mention here.

The barrier between Brunswik's essay on Psychology and the reader is its rather thickly laid on jargon. I wish the author had heeded one of his own remarks: "All too often, however, replacement of terms merely leads to highly 'visible' yet timid neologisms rather than to a true reconsideration or revision of previous notions" (p. 702). In this essay one of the grave defects of the encyclopedia stands out: the lack of concrete problems and examples. That brings me back to my introductory remarks. Most of these articles are deficient in just this spirit of genuine enquiry. Their avowed preference for formalism and "precision" of definition is paralleled by a certain petrified approach towards genuine scientific problems, as much as by a lack of historical penetration and (on occasion) accuracy, such as when Neurath accuses Kant of not having considered Euler's ideas concerning the relativity of space (p. 11); or Nagel's rather mythical summaries of ancient conceptions of scientific knowledge (p. 344f). This is not to deny that Nagel's essay on the theory of probability is perhaps the most balanced, comprehensive and useful article in this volume. Though Nagel holds "that a *general* problem of induction in its usual formulation does not exist" (p. 415), it crops up as the difficulty of finding a precise definition for the term "degree of confirmation for a theory" (p. 409). Indeed, a theory is said to be capable of "being confirmed or verified only incompletely" (*ibid.*)—a position echoing all the good old qualms of the traditional logicians! Nagel's theory of probability comes out squarely on the side of the frequency defenders, as against the classical and the Keynesian views; and he is particularly useful in his pointing out that we still require "pragmatic rules" (p. 395) even for the application of the "empiricist" frequency kind of probability interpretation.

This is, of course, only the first volume of the projected *Encyclopedia*. It is the "heart of an onion" (p. 24) meant to serve as an introduction only. Other volumes deal with the problems of systematisation in the special sciences and in unified science. Still later "layers of the onion" will deal with more specialised problems, and it is to be hoped that the more serious shortcomings of any such encyclopedia, viz. its apparent remoteness from the concrete reality of scientific research and the history of scientific ideas, will be mended. But even without this the present volume is stimulating and some of the individual contributions may well find a permanent place in the curricula of schools of philosophy or philosophy of science.

Melbourne University.   G. BUCHDAHL.

REVIEW

This collection of twelve post-war philosophical essays is
intended to meet some of the needs of students of informal logic.
The book is therefore more restricted in subject matter than its
brothers of the *Logic and Language* series, but this does not
detract from its value, and it should prove just as successful.

The introductory chapter by Professor Flew is entitled
"Philosophy and Language". This paper first appeared in the
Philosophical Quarterly in 1955, and was written as a defence of
the use of certain types of arguments in philosophy. Professor
Flew takes a series of arguments ranged against the practice of
Oxford philosophers in investigating the ordinary English usage
of words and disposes of them quite successfully. For those who
mistakenly believe that modern philosophy is all about words,
this chapter will be found helpful. It also serves to give one the
feeling that the remaining essays are related in some way. For
all but one of them are by Oxford-trained philosophers using the
types of argument here defended.

In Chapter VI a more sophisticated attack than that dealt
with by Professor Flew is made on a type of argument commonly
accepted by Oxford philosophers. This is J. O. Urmson's "Some
Questions Concerning Validity". Here it is argued that since
"valid" is an evaluative term somewhat akin to "good", we cannot
point to an argument (inductive, deductive, or ethical) and say
that "valid" here means "like this argument in certain essential
respects" without committing a kind of Naturalistic fallacy.
Hence we cannot solve the traditional problem of induction or
the non-traditional but equally important problem of deduction
by saying that "valid" means "like certain paradigm arguments in
certain essential respects", we can only say that being like these
is accepted as a *criterion* of validity. But now it is always proper

to ask why we accept the criteria we do, and this is a question we have yet to answer.

Between Chapters I and VI lie P. F. Strawson's "On Referring", which is too well known to need comment here, "The Picture Theory of Meaning", by E. Daitz, which begins by slaughtering some of the early views of Wittgenstein and Wisdom and ends by drawing an interesting contrast between language and cartography, G. J. Warnock's "Metaphysics in Logic" and John Hospers' "What is Explanation?". Warnock's paper, despite the title, is an attack on certain extralogical views of Quine and Russell. He argues that many of their proposed analyses of statements are highly misleading, and that Quine and Russell have themselves been misled by them. So far I would agree, but I would not want to say, on the strength of these arguments, that the proposed analyses are illegitimate. A logician might, after all, be quite clear about the difference between logical equivalence and sameness of meaning. Nor would I agree that many of the proposed analyses are absurd just because there is no ordinary use for sentences like "There *is* a prime number", or "There *is* a house", or "There is a land". (The last two are my examples.) We might, it is true, make ourselves look absurd by using such sentences, but only because we would be insultingly underestimating the knowledge and intelligence of our audience. "There is a prime number" may have no ordinary use, but "There is a square root of minus one" has, at least when we are talking to non-mathematicians.

Philosophers of Science will welcome the inclusion of John Hospers' paper on explanation, H. Brotman's "Could Space be Four Dimensional?", "Probability" by Stephen Toulmin, and "The Nature of Facts", by Peter Herbst. All are interesting and well written.

Finally, there is J. O. Urmson's paper "Parenthetical Verbs", which illustrates the importance of seeing philosophically interesting concepts in the context of philosophically less interesting though related ones; J. J. C. Smart's solid refutation of the view that time flows like a river (only much more evenly), in "The River of Time"; and D. F. Pears' incomprehensible "Time, Truth and Inference".

The book is neatly turned out, remarkably free from printing errors, and is to be recommended to anyone who is seriously interested in modern philosophy. I hope that this will not be the last of these collections of Professor Flew's.

BRIAN ELLIS.

BOOKS RECEIVED

(Mention in this list neither precludes nor guarantees later review.)

ASHBY, W. ROSS. An introduction to cybernetics. London, Chapman & Hall, 1956. ix, 295 p. 36s. (U.K.).

"The basic ideas of cybernetics can be treated without reference to electronics, and they are fundamentally simple. . . . This book is intended to provide such an introduction. . . . Throughout the book no knowledge of mathematics is required beyond elementary algebra."—Preface.

AYER, A. J. The problem of knowledge. London, Macmillan, 1956. x, 258 p. 29s. 9d. (Australian).

Discusses philosophical scepticism about our knowledge of the external world, of the past, and of the experiences of others. "I do not suppose that I have said the last word upon any of these problems, but I hope that I have done something to 'clear the way for their solution. In the course of the book I also make some observations about philosophical method, the dimensions of time, causality, and personal identity."—Preface.

BAILLIE, JOHN. The idea of revelation in recent thought. Oxford University Press, 1956. viii, 155 p. 25s. (Australian).

BELKIN, SAMUEL. Essays in traditional Jewish thought. New York, Philosophical Library, 1956. 191 p. $3.50.

BOULDING, KENNETH E. The image; knowledge in life and society. Ann Arbor, University of Michigan Press, 1956. 175 p. $3.75.

By "the image" the author means the model (dyslogistically, the stereotype) which the individual uses to organise his knowledge and assimilate new information. He discusses the influences which determine the formation of "images" and their importance for sociologists and others. Readable but somewhat superficial.

COURNOT, ANTOINE AUGUSTIN. An essay on the foundations of our knowledge; tr. with an introduction by Merritt H. Moore. New York, Liberal Arts Press, 1956. lxx, 615 p. $9.

First English translation of a French work first published in 1851.

GREENE, THEODORE MEYER. Our cultural heritage. (Rockwell Lectures, Rice Institute, 1953.) Houston, Elsevier Press, 1956. xii, 257 p. $3.50.

"My purpose . . . is to define, as clearly and simply as possible, the vital essence of our Western tradition, to try to make explicit our implicit common faith, and to explore, at the level of long-range strategy, the ways in which we can revitalize this faith."—p. 1.

GINSBERG, MORRIS. Reason and experience in ethics. (August Comte Memorial Trust Lecture No. 2.) Oxford University Press, 1956. 44 p. 6s. (U.K.).

Argues that morality is rational in the sense that definite criteria can be laid down which distinguish higher moralities from lower ones.

HARROD, ROY. Foundations of inductive logic. London, Macmillan, 1956. xvii, 290 p. 39s. 9d. (Australian).

"If induction is to be vindicated, it must be vindicated without any prior assumptions about the nature of the universe whatever. In this I subject myself to Hume, the great master. Starting from his basic principles I have, I would claim, rebutted his sceptical conclusions."—Preface.

HERZEN, ALEXANDER. From the other shore, tr. from the Russian by Moura Budberg, and The Russian people and socialism, an open letter to Jules Michelet, tr. from the French by Richard Wollheim; with an introduction by Isaiah Berlin. (Library of Ideas.) London, Weidenfeld and Nicolson, 1956. xxxi, 208 p. 15s. (U.K.)

Political reflections prompted mainly by the events of 1848, of which the author was an eye-witness. "It is designed as a *post mortem* on the liberal and democratic doctrines—and phraseology—which had suffered shipwreck in the failure of the revolution, and contains ethical and political ideas . . . of arresting originality, possessing affinities with views fully articulated only in our own time."—Berlin.

KOHN, JACOB. The moral life of man; its philosophical foundations. New York, Philosophical Library, 1956. x, 252 p. $3.75.

"None other than a theocentric world can provide the elements for an anthropocentric morality."—p. 236. The author is a professor of Theology at the University of Judaism at Los Angeles.

LEWIS, CLARENCE IRVING. Mind and the world-order; outline of a theory of knowledge. New York, Dover Publications, 1956. xiv, 446 p. $1.95.

Paper-back edition of a well-known work first published in 1929.

PARKIN, CHARLES. The moral basis of Burke's political thought. Cambridge University Press, 1956. viii, 145 p. 12s. 6d. (U.K.).

Argues that a clear and coherent moral theory can be found in Burke's writings. The author's exposition of this is not, however, very clear.

PIAGET, JEAN, AND INHELDER, BÄRBELL. The child's conception of space; tr. from the French by F. J. Langdon and J. L. Lunzer. (International Library of Psychology, Philosophy and Scientific Method.) London, Routledge & Kegan Paul, 1956. xii, 490 p. 42s. (U.K.).

First English translation of a book first published in 1948. An investigation, on the lines of Piaget's earlier studies of children's concepts, of the development of notions about space.

RUSSELL, BERTRAND. Logic and knowledge; essays, 1901-1950, ed. by R. C. Marsh. London, Allen & Unwin, 1956. xi, 382 p. 25s. (U.K.).

Ten papers, none of them included in *Philosophical Essays* or *Mysticism and Logic*. They include "The Logic of Relations", "On Denoting", "The Philosophy of Logical Atomism", "On Propositions", and "On the Relations of Universals and Particulars".

Serouya, Henri. Initiation a la philosophie contemporaine, suivi de, Les philosophies de l'existence. Paris, Librarie Fishbacher, 1956. 312 p. (vol. I). 1200 fr. (2 vols.).

Aims at sketching the recent history of philosophy in a way that will bring out the main intellectual currents of our time. Short chapters on Boutroux, Bergson, the "Marburg school", Brunschvicg, Husserl, Hamelin, Croce, Alexander, Poincaré, Meyerson, Einstein, Durkheim, Lévy-Bruhl, Janet and Freud. The second volume is to deal with the existentialists, from Kierkegaard to Sartre.

Themerson, Stefan. Factor T. London, Gaberbocchus Press, 1956. 68 p. 6s. (U.K.).

Two entertaining and stimulating, if not very profound, essays on philosophical topics (the nature of moral feelings and of belief) and a "Semantic Sonata" which is undoubtedly worth the money. For example:

> Yesterday you were right
> The happiness of the greatest number
> But you don't know that during the nightmare hours
> The natural laws have changed. And to-day
> What was your truth is no more ours than
> The gostak distims the doshes

Weil, Simone. The notebooks; translated from the French by Arthur Wills; London, Routledge & Kegan Paul, 1956, 2 v. £2 16s. (U.K.).

The private note-books of the mystic-cum-philosopher who wrote *The Need for Roots*. They contain disconnected thoughts "on an immense variety of subjects" strung together in the inconsequential style of the note-book. Those who enjoy this patchy kind of literature will find them quite interesting.

Weilgart, Wolf. Was ist normal im Schatten der Atombombe?; zur Psychologie des Aggressionstriebes. Vienna, Gerold, 1957. 132 p. DM 5.80.

Wilson, John. Language and the pursuit of truth. Cambridge University Press, 1956. xii, 105 p. 8s. 6d. (U.K.).

Introduction to semantics, in simple terms, for laymen. The author is a secondary school teacher. Covers the distinction between use and meaning, verification, attitude-statements, value-statements, etc. Should be useful for beginning students or adult education classes.

Wittgenstein, Ludwig. Remarks on the foundations of mathematics; ed. by G. H. von Wright, R. Rees, G. E. M. Anscombe; tr. by G. E. M. Anscombe. Oxford, Blackwell, 1956. xix, 196 + xix, 196 p. 37s. 6d. (U.K.).

Similar, in format and editorial treatment, to *Philosophical Investigations*. Compiled from manuscripts written between 1937 and 1944. Deals with such topics as the nature of mathematical proof, the relation between logic and mathematics, etc.

NOTES AND NEWS

A.A.P.P. Congress, 1957

The annual congress will be held at Sydney University from the evening of Monday, August 19th, till the morning of Friday, August 23rd. The Annual General Meeting will take place on Wednesday, August 21st. All inquiries should be addressed to Mr. T. A. Rose, Department of Philosophy, Sydney University, Sydney, N.S.W.

Twelfth International Congress on Philosophy

The International Federation of Philosophical Societies will hold its Twelfth International Congress at Venice and (for one session) at Padua in September, 1958.

Anyone who wishes to attend should write to the Congress Secretary, Professor Carlo Givcon, Via Donatella 16, Padova, Italy, for an invitation. As papers to be read are to be circulated about October, 1957, inquiries should be made well in advance.

Victorian Studies

Indiana University is sponsoring a new quarterly journal to be called *Victorian Studies*. It is expected to begin publication in the fall of 1957. It is to be an interdisciplinary journal dealing with the arts, humanities, and sciences as they relate to England approximately from 1830 to 1914. The editors welcome contributions which should be sent to: Victorian Studies, Indiana University, Bloomington, Indiana.